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FARM BUILDINGS

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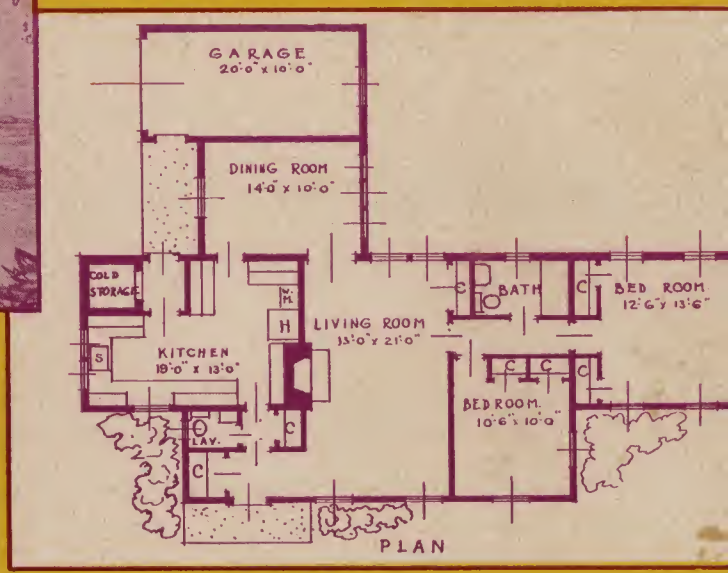

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For each of the houses, a complete set of plans is available for $15.00 a set, which includes:

Blueprints on the scale of one quarter inch to the foot (universally used by architects and builders) of every floor; elevations; and details on a larger scale of special items such as fireplaces and built-in features, with specifications incorporated.

Duplicate set of blueprints, $5.00.

Blueprints for farm buildings are supplied at rates specified above

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AUTHENTIC PUBLICATIONS, Inc., 145 West 57th Street, New York 19, N. Y.

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EASY TO BUILD

RANCH HOUSES

and

FARM BUILDINGS

Contents

Authentic Publications, Inc.

145 West 57th Street ***New York 19, N. Y.***

FOREWORD

The farm residences as well as the farm outbuildings shown in this book have been designed to comply with the new loan requirements of the Farmer's Home Administration. This is not to be confused with the Federal Housing Administration, commonly known as "F.H.A."

There are certain basic requirements which have to be complied with in order to obtain the new easy to carry loans under the Farmer's Home Administration. These are dealt with elsewhere in this volume.

Most of the plans for farm residences shown here are expansible, and additional rooms may be added easily.

The designs for the barns, stables, dairy buildings etc., are all the result of the latest research in this field, approved also for Farmer's Home Administration loans, and designed to cut operating costs, a very important factor, under present day farm management conditions.

Increasing controls now being placed on agricultural production, together with long distance supply lines demand that the farm manager or operator "retool," so to speak, in order that labor costs be reduced to fit the new scheme. Fortunately this may be done today through liberal government loans, at reduced interest rates, making it possible for a farmer with obsolete or inefficient equipment, to once more step into stride and be able to produce more at a larger margin of profit, providing proper design and study is put into the farm arrangement. This we have endeavored to do through intensive and far reaching research in this field.

FARMER'S HOME ADMINISTRATION WILL HELP YOU FINANCE YOUR NEW HOME OR BUILDINGS

The Housing Act which was passed by Congress in the fall of 1949, carries with it a provision setting up the Farmer's Home Administration loan agency. Under the provisions of this Act, a farmer can build a new farm house, or other needed farm buildings, on the most liberal terms ever offered.

During the next four years, 275 million dollars will be loaned by the Farmer's Home Administration to finance farm buildings. An additional 25 million will be made available for essential repair loans.

To be eligible for these loans it is only necessary to be a farmer, full or part time, unable to obtain loans from a local bank, to own at least 10 acres of land, capable of producing at least $400 worth of farm commodities a year, and have reasonable prospects of repaying the loan in 33 years.

One may have existing first and second mortages, and still obtain a third mortgage loan from the Farmer's Home Administration, if the farm equity is adequate.

The interest rate charged by the government is 4% annually for the use of this money, and payments on the principal and interest will be arranged to come due, as you receive your income from produce sales.

During bad crop years a moratorium may be declared on principal and interest payments.

Funds have already been loaned in 34 states, and thousands of appraisals have been made, upon which loans will soon be approved.

It takes approximately 60 days to process a loan application. The loans made so far range from $2,000 to $10,000. Before making application for a loan one must have a plan which will meet with the government requirements, and must have received bona fide cost estimates. All of the designs shown herein are acceptable for loans under the Farmer's Home Administration regulations.

To apply for the loan, it will be necessary to take your plans and cost estimate to the local banks and see if they will loan you the money; if they will not, then apply to the office of the Farmer's Home Administration which is located in your county seat.

Money may be borrowed to build your own farm home, a home for a tenant farmer, various other buildings, and for repairs to existing farm buildings.

The farmer's equity in the farm is the only security required.

Veterans have preference, but the farmer does not have to be a veteran.

BUILDING PROGRAM GUIDE

As the buildings shown in this book are all farm residences or buildings designed for the housing and care of stock or commodities, it is assumed that the prospective owner either possesses the farm land, or has in mind the purchase of such farm land.

There are, however, certain points to be borne in mind when starting on a building program:

1. Assuming the farm is now owned, the first point to be considered is the selection of the site for the house, and/or the immediate farm structures. This is known as the farmstead, and usually consists of one or two acres of land situated near the highway, near a good source of water, well drained, and if possible, land which is the least valuable for productive purposes except for the home table garden, and for possibly poultry raising.

2. The proper design for the residence and adjacent buildings, bearing in mind the family requirements, the type of farming to be carried on, and the orientation of the various units making up the farmstead or "home acre."

3. The budget; like every other enterprise, the farm budget must be sound and well thought out. It must be a balanced budget, with the proper proportioning to assure the sucess of the farm project. In most instances, some temporary housing must be accepted until the project is on its feet so to speak, and can carry its proportion of the financial load, without causing losses from some other phase of the project.

4. The selection, in the case of the build-

(*Continued on page* 32)

1 ANDROSCOGIN

This small farm residence was developed like the others in this volume to not only adequately house the average farm family, but to comply with the loan standards set up by the Farmer's Home Administration.

This plan contains all of the essential areas required plus a few of the desirable features demanded today by the farm family.

Farm life demands more than mere shelter. There is no other mode of livelihood in which the dwelling is so closely tied with the business than is farming.

A farm dwelling must be so planned that the daily routine of housework, farm chores, the caring for, and conservation of, the produce, can go on simultaneously.

A glance at the plan of this dwelling shows that there is a work room containing a separate lavatory near the rear entrance, also space to receive and care for vegetables, eggs and other commodities. This work room is adjacent to the kitchen, as in nearly every instance the two areas are used together.

The kitchen or near center of the farm home, contains not only food preparation equipment, but the laundry equipment and the heater for the home.

The sleeping rooms are located at one end of the house, and there is direct access from them to the rear entrance, a very important item in farm house design.

The living room and dining alcove are located properly in relation to the other component parts of the plan.

This house has poured concrete footings located below frost line, and a foundation of concrete blocks, laid up in Portland cement mortar to the grade line.

As the heating system is located on the first floor, no cellar is required, although a cellar could be incorporated if desired, and a stairway located in the work room would provide access to it.

While the house as shown is a frame structure, there is no reason why it could not be constructed of other materials such as brick, brick veneer, concrete block or stone.

The frame of this building is all of spruce or fir, and the dimensions are such that stock lengths and sizes may be used without waste.

The exterior walls are sheathed with tongue and groove sheathing, applied diagonally for bracing. Over the sheathing heavy waterproof building paper is applied, with the joints well lapped, and then the exterior facing material, which in this case, is vertical random width sheathing, with joints covered with battens.

The windows are all stock double hung type, with interlocking weatherstrips.

The exterior trim such as cornices, frieze, rake boards, and porch work, is all clear white pine.

The roof rafters are sheathed with tongue and groove boarding, and then covered with 30 lb. roofing felt. Then to the roof shingles either cedar, asphalt, asbestos or slate are applied.

All flashings are 16 oz. copper, and copper pans and head flashings are provided for all exterior doors and windows.

The chimney is constructed of hard burned common brick, and has terra cotta flue linings. The porch floor is paved with blue stone laid in cement.

The kitchen and workroom areas have either linoleum or asphalt tile finished floors, and stock wood cabinets. A space for keeping farm records has been provided in the workroom.

All interior walls except bath and lavatory are covered with gypsum insulating board, with taped joints, and painted. The ceilings are covered with accoustic insulating board, applied to wood strapping. In addition to this material there is a layer of mineral wool insulation 4″ thick above all ceilings.

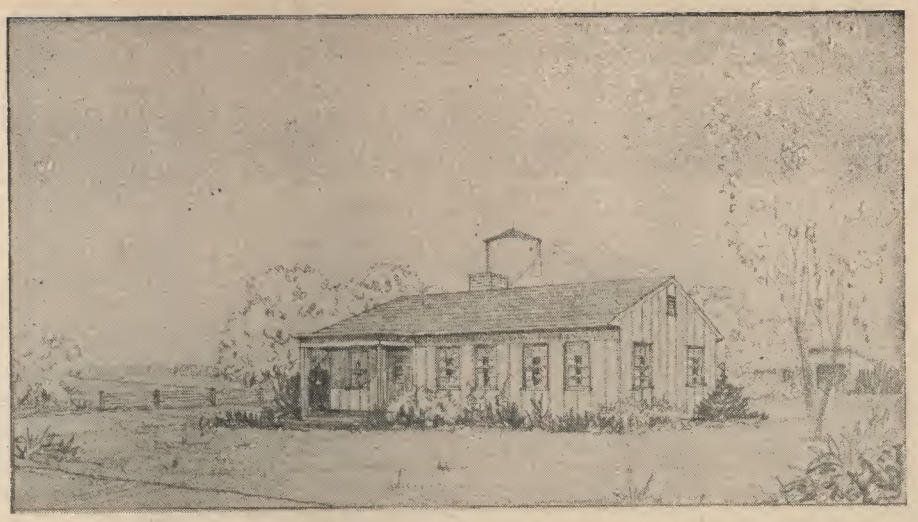
The interior trim is stock pattern pine, moulded, and the interior doors are stock flush veneer type, easy to keep clean and operate.

Except for kitchen, bath, and lavatory, all rooms have finished floors of selected T. and G. red oak.

Both the bath and the lavatory have ceramic tile floors, and 6′ high glazed tile wainscots, with hard plaster walls above.

The plumbing is simple and the piping direct, to keep down maintenance costs.

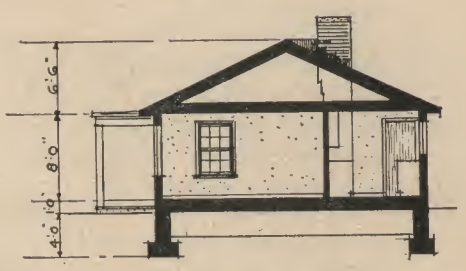
A compact high efficiency type oil burning recirculating warm air heater is located in the kitchen, and supplies heat to all rooms through metal ducts.



1. ANDROSCOGGIN 15,200 cubic feet. Including living room, dining alcove, kitchen, workroom, three bedrooms, bath and lavatory.

Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00

ELEVATION



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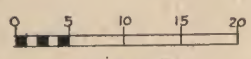

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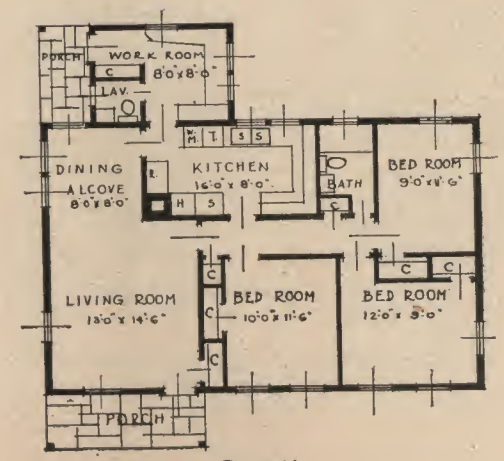


PLAN

2 WALDO

This modern bungalow type farm residence is extremely compact, and has been designed so that it may be expanded to provide additional bedrooms if desired, also a full dining room could be added later.

The workroom adjacent to the kitchen has a walk-in type cold storage room, a very desirable feature in any farm dwelling.

The footings of this house are, like all of the others in this book, made of poured stone concrete.

The foundation walls are 12″ thick high strength concrete block, laid up in Portland cement mortar.

The chimney which contains the fireplace and heater flue, is built of hard burned common brick. The flue linings are terra-cotta. The fireplace has a fire brick lining and inner hearth, while the facings and outer hearth are selected face brick.

The framework of the building is all of sound spruce or Douglas fir, properly designed and engineered to last a life-time. The room sizes have been worked out so that stock lengths and sizes of framing lumber can be used without waste.

The exterior walls of this building are first sheathed with an asphalt impregnated sheathing board which comes in large sheets and is easy and economical to apply. Over this is applied a layer of heavy waterproof building paper, and finally the finish surface material, which in this case, is wide waterproof resin bonded plywood, applied clapboard fashion, with aluminum nails to prevent rust stains.

The roof is sheathed with tongue and groove N. C. pine sheathing, over which is applied 30 lb. roofing felt, and then either asphalt or cedar shingles.

The windows are all stock double hung type, easily obtainable and installed. The exterior trim such as cornices, frieze, soffits, porch work, and door and window trim, is all clear white pine painted.

All interior walls and ceilings are plastered three coats over heavy ribbed metal lath.

The interior trim is all stock pattern moulded pine, including base, window and door trim, aprons, and cornices. The dining end of the living room is sheathed with wide random width pine boards with moulded joints. The interior doors are stock flush veneer type, which, having no mouldings, are easy to keep clean.

The finished floors except in kitchens, bath, lavatory and workroom are all selected tongue and groove red oak.

The kitchen and workroom have asphalt tile floors, and stock pattern pine cabinet work.

The cold storage room is built-in as a part of the house, and has 6″ thick granulated cork insulation. The compressor is mounted above the cold storage room, and temperatures as low as 10 degrees below zero may be maintained if desired.

The bath has a ceramic tile floor, and a 6′ 0″ high glazed tile wainscot. The lavatory has an asphalt tile floor, and an asbestos board wainscot 6′ 0″ high.

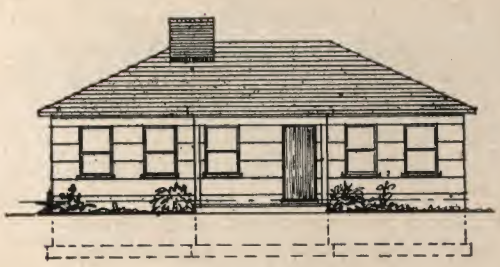
All ceilings are insulated with 4″ of mineral wool.

The flashings are all 16 oz. copper, and copper pans and head flashings are installed at all exterior doors and all windows.

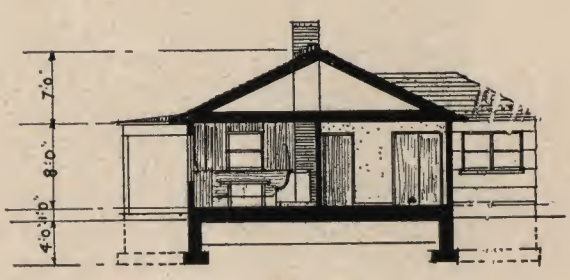
An oil fired high efficiency type warm air heater is located in the kitchen, and supplies heat to all rooms through metal ducts.

2. *WALDO* 16,736 cubic feet. Including living-dining room, kitchen, workroom, three bedrooms, bath, lavatory and cold storage room.

Complete working plans (with specifications incorporated)	$15.00
Duplicate Set	5.00



ELEVATION



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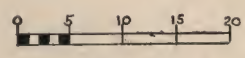

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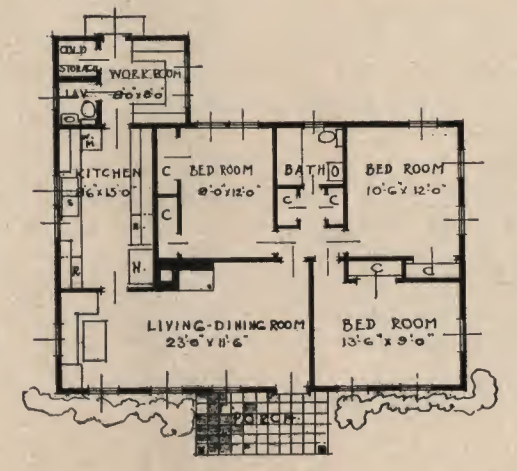


PLAN.

3 WASHINGTON

In designing this farm house two ideas have been kept in mind, light, air, and sunshine; and ease of housekeeping. The average farm housewife must keep her housework down to a minimum, as she is also obliged to participate in the daily routine of farm work, preparing vegetables, preserving of food, and often acting as business agent for the farm.

Country life also involves participation in community social activities, and as in many instances there are no meeting places, the neighbors gather at the different farm houses.

With this last requirement in mind, the living room has been made the center of the plan, with the sleeping and work areas at either end. This arrangement allows the farm work to go on, as it must, and also affords privacy for those who wish it.

The dining room, located at the rear of the kitchen and the living room, is in a strategic position. The housewife may serve a meal for the family and extra help at harvest time, and, if necessary, the garage may be utilized as extra dining space. All this can be done without disrupting the family living areas.

The footings are of poured stone concrete, 1 : 2 : 4 mix, located below frost line. The foundation walls to grade line are constructed of high strength concrete block laid up in Portland cement mortar.

The chimney containing the fireplace and heater flue is constructed of hard burned common brick. The flue linings are terra-cotta. The fireplace has a fire brick lining and inner hearth, while the facings and outer hearth are selected face brick.

The design shown herewith is of frame construction, that being the most economical, but there is no reason why the house could not be constructed of brick, brick veneer, concrete block, or a combination of these materials, if one wished to spend a little more money.

The frame of the house is all of good sound fir or spruce, well designed and engineered so that it will last for generations.

The exterior walls are sheathed with tongue and groove N. C. pine sheathing applied diagonally for strength. Over this sheathing is applied heavy waterproof building paper, and finally wide sheets of asbestos board as siding.

This not only gives a modern appearance to the exterior, but affords a large measure of fire protection, an item which must not be overlooked in a farm dwelling, located many times, at a great distance from any fire department.

The roof is also sheathed with tongue and groove sheathing, then covered with 30 lb. roofing felt, and finally with asbestos shingles, also for fire protection and long life.

The windows are either wood or metal double hung type, and the exterior trim is of white pine, painted to contrast with the wall color. The shutters are flush panel plywood construction.

All flashings are 16 oz. copper, and copper pans and head flashings have been provided for all exterior doors and windows.

The interior walls and ceilings, except the garage, are plastered three coats over heavy ribbed metal lath. The garage walls and ceiling are covered with asbestos board as an added fire protection.

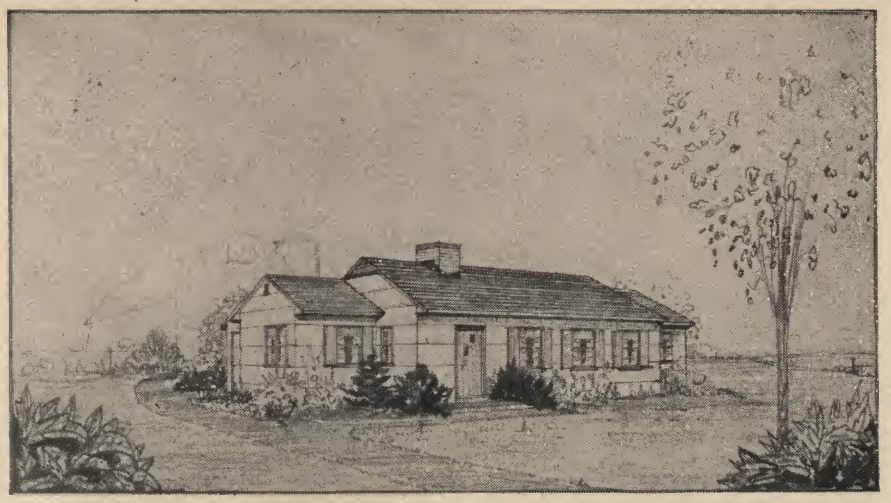
The cold storage room is insulated with 6″ of cork, and will hold a temperature of 10 degrees below zero if desired.

All interior trim is of stock pattern pine, painted, and the floors except in the kitchen, bath and lavatory are selected red oak.

The kitchen has an asphalt tile floor, and stock pattern pine cabinet work.

Both the bath and lavatory have ceramic tile floors and 6′0″ high glazed tile wainscots.

An oil fired high efficiency type warm air heater is located in the kitchen, and supplies regulated warm air to all rooms through metal ducts.

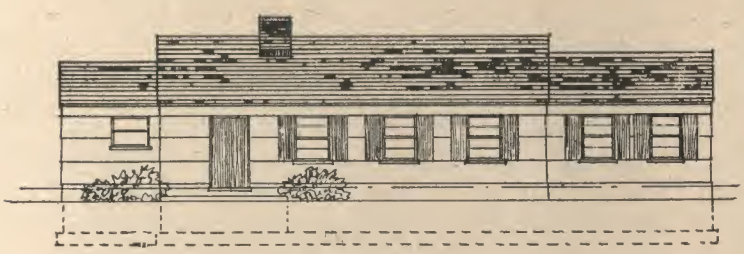


3. *WASHINGTON* 23,680 cubic feet. Including living room, dining room, kitchen, two bedrooms, bath, lavatory, front entrance vestibule, garage and cold storage room.

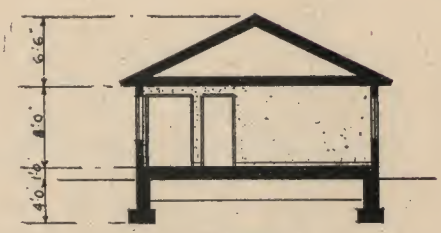
Complete working plans

(with specifications incorporated) $15.00

Duplicate Set 5.00



ELEVATION



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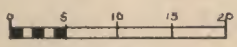

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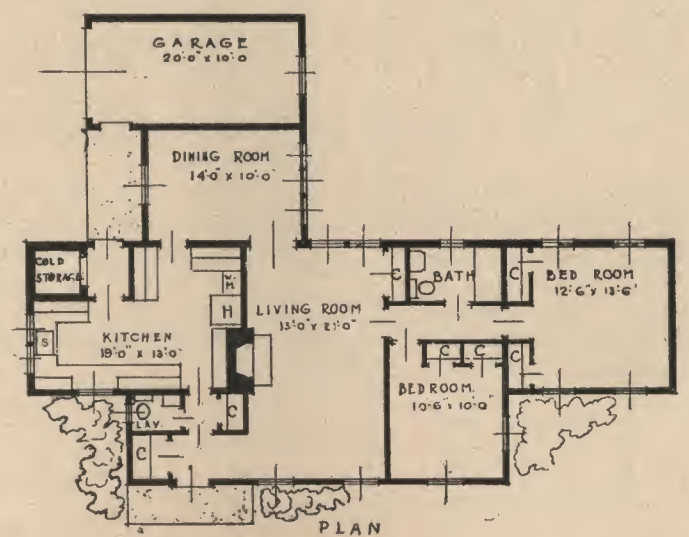


PLAN

4 YORK

This most efficiently planned little farm dwelling is the result of much research, and has been commended by the U.S. Department of Agriculture as an example of good farm home design.

Notice the closely connected work areas at the rear, composed of kitchen, workroom and enclosed work porch, the cold storage room and lavatory. Here is a complete farm work center segregated from the living area but still easily accessible.

Privacy for the family is maintained at all times, and the "front of the house" can be kept in order regardless of any farm activities which may be under way in the work area.

The enclosed porch can also serve in an emergency, as an extra dining room for overflow help at harvest time, and also provides a place for the child to play while under the watchful eye of the farmer's wife, busy in the kitchen or work area.

Having no cellar, an unnecessary expense in these days of mechanized preservation equipment, the footings are located just below frost line and are of poured concrete. The foundation walls are 12″ thick high strength concrete block, laid up in Portland cement mortar to grade line.

The frame of this house is all of sound Douglas fir or spruce, properly engineered for strength and rigidity. Floor joists are 2 x 10, studs 2 x 4 doubled at all openings, sills are 4 x 6, corner posts 4 x 6, plates 4 x 4 and the rafters are 2 x 8. All floor joists are cross bridged once in each span to insure rigidity.

The chimney containing the heater flue and the fireplace is constructed of good hard burned common brick, laid up in Portland cement mortar.

The flue linings are of terra-cotta. The fireplace has a fire brick lining and a built-in cast iron throat and damper.

The exterior walls are first sheathed with tongue and groove N.C. pine sheathing applied diagonally, and then covered with heavy waterproof building paper before receiving the exterior facing, which is wide, resin-bonded, waterproof plywood siding, applied with aluminum nails to prevent rust stains.

The roof rafters are also sheathed with tongue and groove sheathing, and then covered with 30 lb. roofing felt, over which is applied asbestos shingles or slate, for fire protection and long life.

The exterior trim is all of clear white pine, and the windows are stock wood double hung type, completely weatherstripped with interlocking bronze weatherstrips.

The interior walls and ceilings are plastered three coats of plaster over heavy metal lath.

The interior trim is stock pattern white pine painted. The interior doors are stock flush veneered type, and the finish floors except in the kitchen, workroom, and baths, are all selected oak or maple.

The floors in the kitchen and workroom are asphalt tile, and the kitchen and workroom cabinets are of pine, stock pattern.

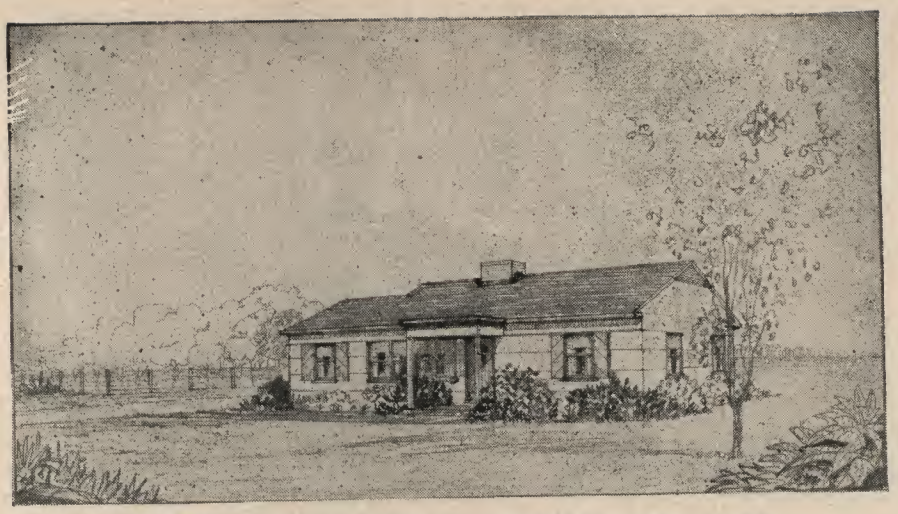
The bath has a ceramic tile floor, and a 6′ high glazed tile wainscot. The rear lavatory has a cement floor, and an asbestos board wainscot 4′ 0″ high.

The cold storage room is insulated with 6″ of cork, and will maintain a temperature as low as 10 degrees for any length of time.

All ceilings are insulated with 4″ of mineral wool.

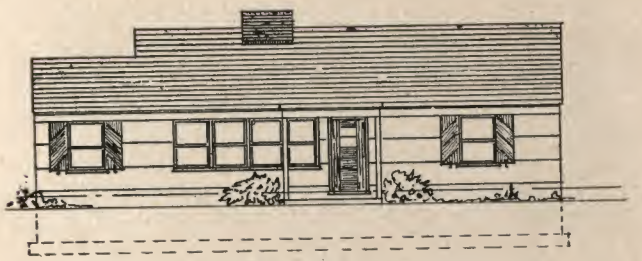
Flashings are 16 oz. copper, and exterior doors and windows are equipped with copper pans and head flashings.

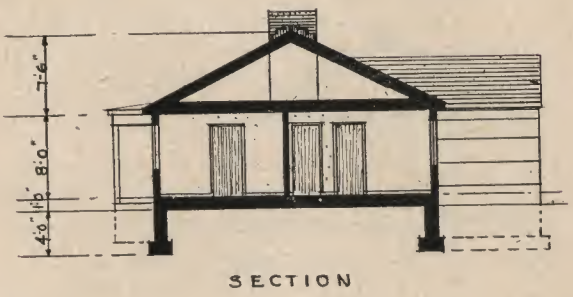
Either an oil or gas fired recirculating warm air, or forced hot water heating system is recommended for this house.

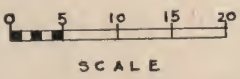


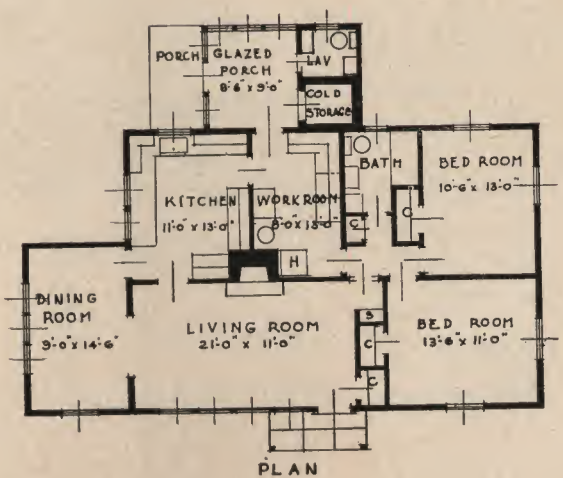
4. *YORK* **19,453 cubic feet. Including living room, dining room, kitchen, workroom, two bedrooms, bath, lavatory, cold storage room and glazed porch.**

Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00









5 SULLIVAN

This simple little colonial type farm dwelling, while containing the necessary elements for family living and farm home operation, might be called a "basic farm house."

There is little or no waste space in this plan. The living sleeping and work areas are properly segregated, so that all family activities may go on without confliction. The house is economical to build and maintain. A wing containing two more bedrooms and another bath can be added later if desired.

The footings which are of poured stone concrete, are located 4′ below grade, and the foundation walls are constructed of 12″ high strength concrete block, laid up in Portland cement mortar.

While the house shown has been executed in frame construction for sake of economy, it could be built of brick, brick veneer, concrete block, or stone if desired.

The chimneys are constructed of hard burned common brick with terra-cotta flue linings. The fireplace has a fire brick lining and a built in cast iron damper.

The frame is Douglas fir or spruce, and the room sizes are such that stock lengths and sizes of timber may be used without waste.

The exterior walls are first sheathed with asphalt impregnated sheathing sheets, which are large in size and economically installed. Over this, a layer of heavy waterproof building paper is applied, and finally standard pine clapboards.

The roof is sheathed with regular tongue and groove roof sheathing, which is then covered with 30 lb. roofing felt, and shingled with either asphalt or asbestos shingles.

All exterior trim is clear white pine painted. The windows are stock pattern double hung type, equipped with interlocking bronze weatherstrips.

All flashings are 16 oz. copper, and all exterior doors and windows are equipped with copper pans and head flashings to prevent leakage at these points.

All interior walls and ceilings are covered with ½″ gypsum board, with the joints pointed and taped for painting.

The interior trim is all stock pattern pine painted, and the finish flooring throughout, except in the kitchen, workroom and bath is selected red oak, tongue and groove flooring, applied over 30 lb. felt.

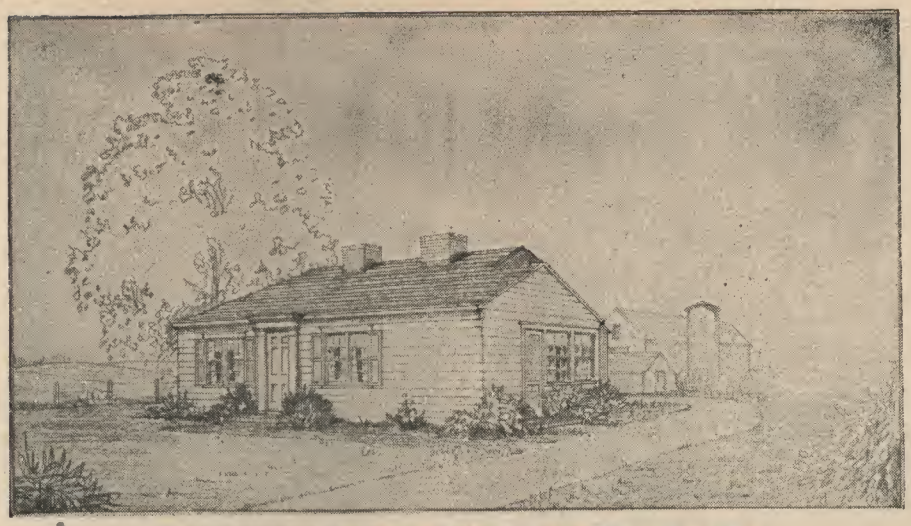
All ceilings are insulated with 4″ of mineral wool insulation.

The bath has a ceramic tile floor, and a 6′ high glazed tile wainscot. The lavatory has an asphalt tile floor, and colored asbestos board wainscot 4′ 0″ high.

The kitchen and workroom have asphalt tile floors, stock pine cabinet work, and enamel iron acid resisting sinks.

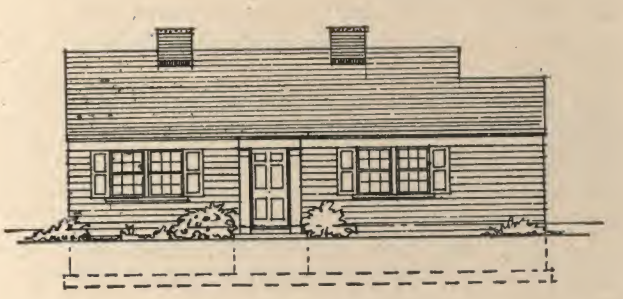
The cold storage room is a full height "walk-in" cooler with mechanized refrigeration, and will keep a sub-zero temperature if desired, for an indefinite period.

Either an oil fired warm air or forced hot water system with automatic controls will function properly in this house.

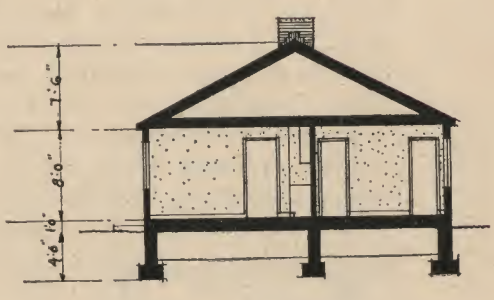


5. SULLIVAN 17,865 cubic feet. Including living room, kitchen-dining room, workroom, two bedrooms, bath, cold storage and lavatory.

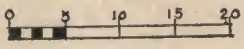
Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00



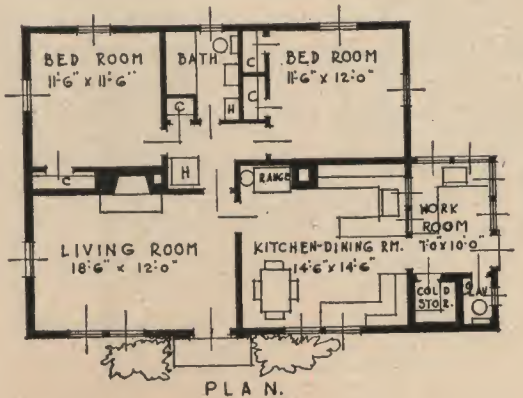
ELEVATION.



SECTION



SCALE.



PLAN.

6 WESTCHESTER

Just imagine this trim little modern colonial farm house located in the center of a green, elm shaded lawn! A pretty picture, but also a very efficiently planned farm house, with all of the requirements for farm housekeeping, properly arranged. Not only that, this house like all of the others in this book, complies with the Farmer's Home Administration requirements for building construction loans.

The footings of this house are of poured stone concrete, and are located 4′ below grade so as to be below the frost line.

It may be mentioned here that while no cellar has been provided for this house, one could be included, if desired, under the main block of the house.

The foundation walls are 12″ thick high strength concrete block, laid up in Portland cement mortar, to the grade line.

While a frame house design has been shown for the sake of economy, if one wished to spend a little more money this house would be a perfect gem if done with white washed brick or stone.

The chimney containing the fireplace and the heater flue is built of good hard burned common brick, laid up in Portland cement mortar. The flue linings are terra-cotta. The fireplace has a fire brick lining and a built in cast iron damper.

The framework of the house shown is of Douglas fir or spruce. The sills are 4 x 6, the floor joists 2 x 10, the studs 2 x 4 doubled at all openings. The ceiling beams are 2 x 6 and the rafters are 2 x 8. All floor joists are cross bridged once in each span for rigidity.

The exterior walls are diagonally sheathed with tongue and groove sheathing, and covered with heavy waterproof building paper. Over the building paper the exterior siding, which is wide waterproof plywood, is applied.

The roof is also sheathed with tongue and groove sheathing, and then covered with 30 lb. roofing felt, and finally shingled with either wood or asbestos shingles.

The exterior trim is clear white pine painted. The windows are stock pattern double hung type, equipped with bronze interlocking weatherstrips.

All interior walls and ceilings except the garage are plastered three coats over heavy metal lath.

The interior trim is stock pattern pine, painted, and the interior doors are stock six panel colonial type.

The finished floors, except the kitchen, workroom, and bath, are selected tongue and groove red oak, laid over heavy felt. All ceilings are thoroughly insulated with 4″ of mineral wool insulation.

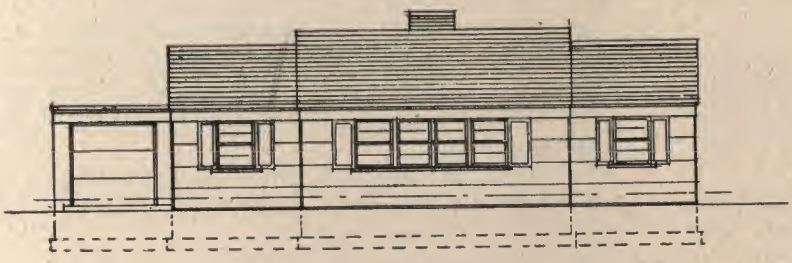
The workroom and kitchen have asphalt tile floors, and stock pine cabinets with linoleum counter tops and metal edge strips.

The baths have ceramic tile floors, and a 6′ high glazed colored tile wainscot. The shower stall in the private bath is a built in colored enamel iron shower, with a porcelain receptor.

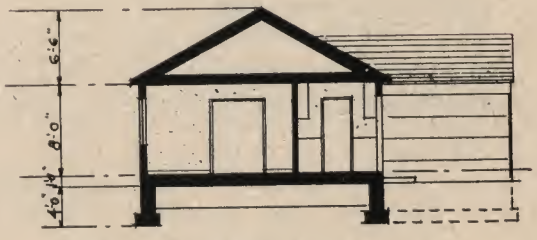
The heating system for this little house consists of a new type, oil fired, high efficiency automatically controlled recirculating warm air heater, located in the workroom, and supplying all rooms through a metal duct system.

6. WESTCHESTER 18,088 cubic feet. Including living room, dining room, kitchen, workroom, two bedrooms, two baths and garage.

Complete working plans (with specifications incorporated)	$15.00
Duplicate Set	5.00



ELEVATION



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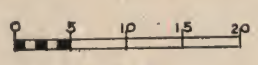
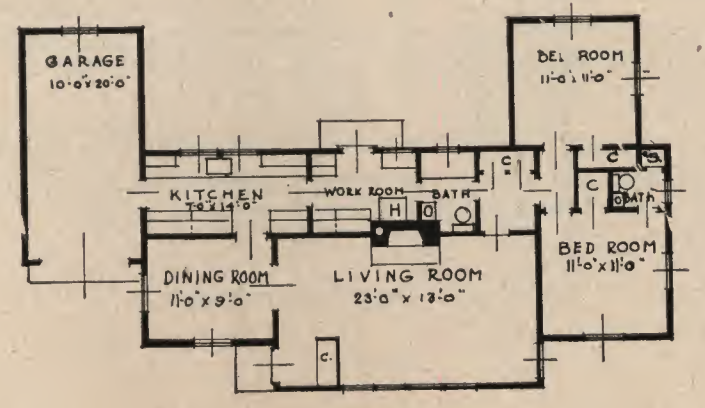


SCALE



PLAN

7 PUTNAM

This farm dwelling is another "basic farm house," designed especially to provide adequate accomodations for a farm family, according to the minimum recommendations of the U. S. Farmer's Home Administration, for farmers home construction loans.

This house is also capable of expansion, by addition of a bedroom wing later if desired, without disturbing the functional areas. Also, the living room may be enlarged by an extension to the right. In this case, the small front bedroom to the left of the entrance could then be used as a dining room. So we have started with a nucleus around which to build a complete farm house and, at the same time, have not sacrificed the essential operating areas.

The footings of this house are poured concrete, and as no cellar has been provided for, they are located only 4′ below the grade line, which is sufficient to escape frost action even in the North.

The foundation walls are constructed of 12″ thick high strength concrete block, laid up in Portland cement mortar.

The chimney is constructed of good hard burned common brick, also laid in Portland cement mortar, and has terra-cotta flues.

The frame of this house is all of Douglas fir or spruce, properly designed and engineered to assure a lifetime of strength, and freedom from sagging and deterioration.

The exterior walls and roof are sheathed with tongue and groove sheathing, applied diagonally to the walls, and horizontally to the roof.

The walls are then covered with heavy waterproof building paper, and finally enclosed with standard bevel siding or clapboards.

The roof is shingled with asphalt shingles or asbestos shingles, laid over 30 lb. roofing felt.

The exterior trim including cornices, soffits, frieze, porch work, etc., is all clear white pine. The windows are stock double hung type, equipped with interlocking bronze weatherstrips and copper screens.

All flashings are 16 oz. copper, and copper pans and head flashings are provided for all exterior doors and windows, to prevent leakage at these vulnerable points.

All ceilings throughout are thoroughly insulated with 4″ of mineral wool, thus effecting a considerable saving in fuel costs.

All interior walls and ceilings are plastered three coats over heavy metal lath, ribbed.

The interior trim is all stock pattern moulded pine.

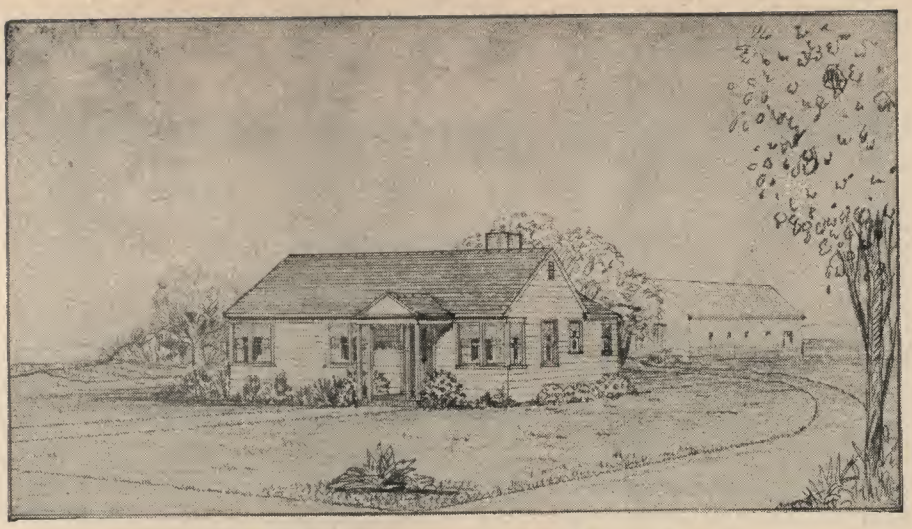
Finished flooring in all rooms except workroom, kitchen, and bath, is selected red oak or maple, laid over heavy felt.

The kitchen and workroom have asphalt tile finish floors, and stock wood cabinets with linoleum counter tops.

The bath has a ceramic tile floor and a 6′ colored glazed tile wainscot. The lavatory near the workroom has an asphalt tile floor, and glazed colored asbestos board walls.

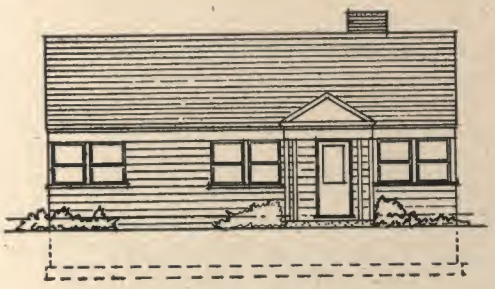
The freezer, which is a full height, "walk-in" type, has 6″ cork insulation walls and ceiling, and is mechanically cooled, so that food and produce may be held for indefinite periods.

A new type gas or oil fired high efficiency warm air heater is located in the kitchen, and supplies warm air through a metal duct system to all rooms.

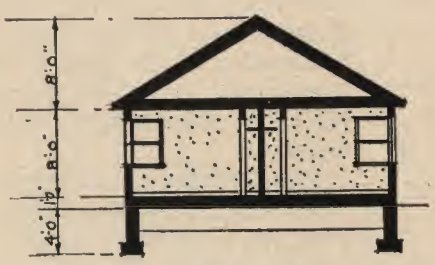


7. *PUTNAM* **15,840 cubic feet. Including living room, dining-kitchen, workroom, three bedrooms, bath, freezer and lavatory.**

Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00



ELEVATION



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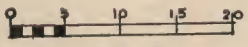
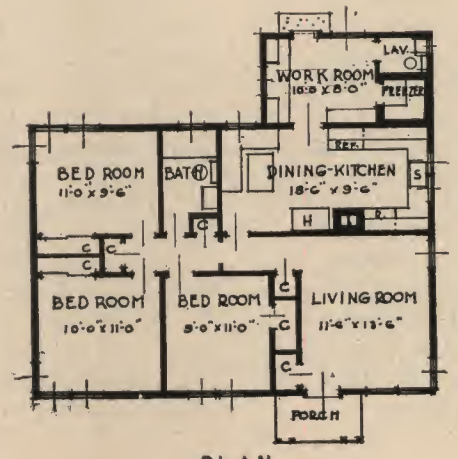


SCALE



PLAN

8 FRANKLIN

This little farm house is a solar type, having large glass areas protected by wide overhangs, for perfect control of the sun's rays.

Cross ventilation has also been kept in mind in the designing of this house. It will be noted that the central living room has full height glazed doors on both sides. This room also serves as a center of activities, with the sleeping rooms at one side, and the service or work areas at the other side.

The kitchen has been designed for farm use, having not only the necessary equipment for food preparation, but also such operations as laundering, food conservation, and the preparation of farm commodities for market.

In the cellar there is room for the heating plant, a cold storage room and, if the main commodity of the farm is eggs, an air conditioned egg room can be installed close by the cellar stair, which is adjacent to the rear entrance.

The footings are of poured stone concrete. The cellar and foundation walls are high strength concrete block, laid up in Portland cement mortar. The cellar floor is a 4″ thick concrete slab laid over 6″ of porous fill. Should an egg handling room be contemplated in the cellar, no floor should be installed. Simply leave the earth as a floor.

The chimney is constructed of hard burned common brick, with terra-cotta flue linings. The fireplace has a fire brick lining, a built-in cast iron damper, and is faced with cut local stone. The terraces are paved with random rectangular bluestone paving set in a cement bed.

Egg handling requires a certain amount of cool humidity which can most economically be provided for by sprinkling an earth floor in a cellar room.

The frame of this house is simple, and is all constructed of Douglas fir, spruce, or even hemlock if that is a native timber. All rooms have been dimensioned so that stock lengths and sizes of timber can be used, without waste or labor in cutting.

The exterior wall studding is covered with tongue and groove sheathing applied diagonally for strength, and then the building paper, which is heavy waterproof paper, is applied. Over this the exterior wall covering is nailed. This is either redwood or pine siding. The portion shown with vertical siding has 1″ x 2″ wood battens to seal the joints, and the horizontal siding is laid "shiplap" with a wide joint, to give a horizontal shadow line.

The exterior trim such as cornices, soffits or overhangs, door and window trim, frieze and rake boards, are all of white pine. The shutters are constructed of resin bonded waterproof plywood which has a striated surface.

All windows are stock double hung type, fitted with bronze, interlocking weatherstrips.

The flashings are all of 16 oz. copper, and copper pans and head flashings are provided for all exterior doors and windows.

The roof is first sheathed with tongue and groove roof boards, covered with 30 lb. roofing felt, and then shingled with redwood or cedar shingles.

All interior walls and ceilings are plastered three coats over heavy ribbed metal lath, and the cellar ceiling is plastered two coats of cement plaster over metal lath for fire protection.

The interior trim is all stock pattern pine painted, and the interior doors are flush veneered birch doors, which may be painted or finished natural as desired.

The finish flooring except in the kitchen and bath is selected tongue and groove red oak laid over 30 lb. felt.

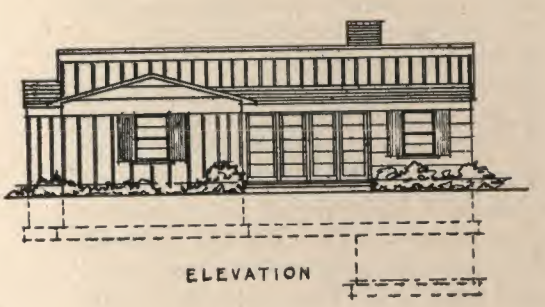
The kitchen has an asphalt tile floor, and wood or metal cabinets.

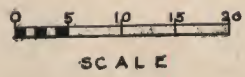
The bath has a ceramic tile floor, and a 6′ high glazed tile wainscot.

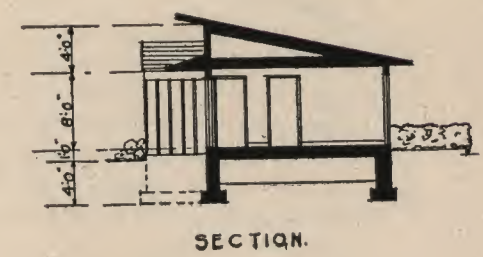
This house, having a basement or cellar, may be heated by either steam, hot water or warm air as desired, and any type of fuel may be used.

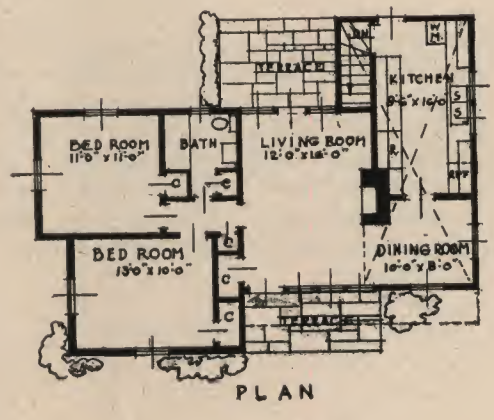
8. FRANKLIN **14,980 cubic feet. Including living room, dining room, kitchen, two bedrooms, bath and partial cellar.**

Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00









9 LIVINGSTONE

This bungalow type little farm dwelling can be very economically constructed, and contains all of the essential areas required for approval of the Farmer's Home Administration loans.

Also, as planned, the house may be expanded to provide two more sleeping rooms and a combination workroom, farm office, and produce preservation center.

The footings of this building are of poured concrete, and are located 4′ below grade line, so as to be below the frost line. The foundation walls are constructed of concrete block, laid in Portland cement mortar to the grade line.

The chimney, which is constructed of hard burned common brick, has terra-cotta flue linings.

The framework of this house is all of sound Douglas fir or spruce, properly engineered to last for generations.

The exterior wall studs are sheathed diagonally with tongue and groove sheathing, over which is applied heavy waterproof building paper, and finally stock pine or redwood bevel siding.

The roof, which is also sheathed with tongue and groove sheathing, is covered with 30 lb. roofing felt, and then shingled with asphalt shingles, asbestos shingles or slate, as desired.

All exterior trim is clear white pine, painted to contrast with the color of the siding.

The shutters are made of waterproof resin bonded plywood and cut out diagonally to the grain of the board to give an interesting effect. The shutters are not painted but are stained so that the natural grain of the wood is visible.

All interior walls and ceilings are covered with gypsum board with pointed and taped joints, so that they may be painted or papered, as desired.

The interior trim is all stock pattern pine trim, painted. The windows are stock double hung type, hung with sash balances and completely weatherstripped.

All ceilings are insulated with 4″ of mineral wool insulation.

Flashings are 16 oz. copper, and copper pans and head flashings have been provided for all windows and exterior doors.

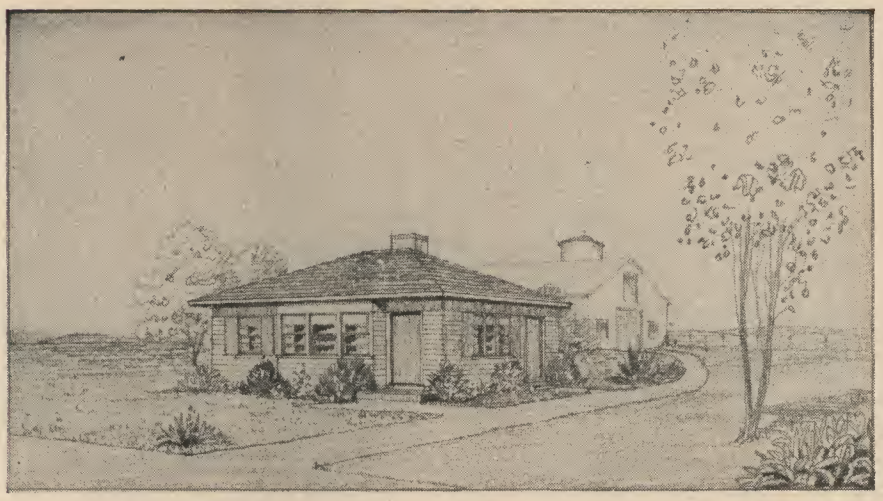
Finished floors in all roms except kitchen and bath are selected tongue and groove and end matched oak, maple, or birch, and are laid over 30 lb. felt.

The kitchen has an asphalt tile floor, and stock wood cabinets, with linoleum counter tops, stainless steel sink, and metal edge strips.

The bath has a recessed tub, a ceramic tile floor, and a 6′ high glazed tile wainscot.

The living room of this house has a dining alcove formed by the combination coat closet and china closet near the main front entrance. These units are constructed of plywood, preferably of birch, which may be finished natural and waxed.

The heater is a high efficiency type forced warm air heater, either gas or oil fired supplying warm, filtered air to all rooms through a metal duct system. This unit also serves, in warm weather, as a cooling system. At night the fan only, may be turned on, which draws the cool night air in through the fresh air intake and circulates it to all rooms.

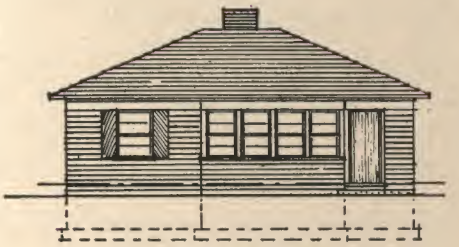


9. LIVINGSTONE **13,312 cubic feet. Including living room, kitchen, two bedrooms and bath.**

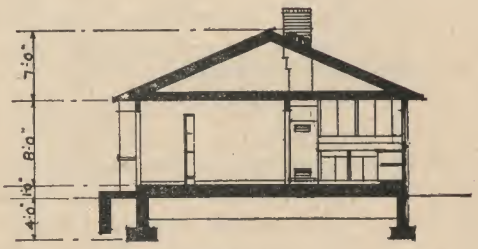
Complete working plans

(with specifications incorporated) $15.00

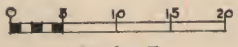
Duplicate Set 5.00



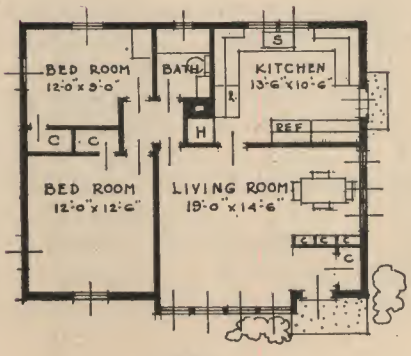
ELEVATION.



SECTION



SCALE



PLAN.

10 SAGADAHOCK

This farm house is more capacious than most shown in this volume, and while very easy to construct and economical to maintain, provides a little more of the essentials required for gracious country living.

Three factors have been kept in mind in the designing of this farm home, serviceability and ease of farm operation, privacy for the farm family, and entertaining as adapted to modern farm life and community conditions.

The living, dining and kitchen areas have been so designed and interrelated in this plan, that it would be a very simple matter for the farmer's wife to entertain the ladies from the Grange, the community Ladies' club, or for the children to hold a 4H meeting of the local "co-op" in the living room without interfering with food preparation, commodity preparation, or privacy of the rest of the family.

While this house as designed, is of frame construction, it may also be built of brick, brick veneer, stone, or a combination of these materials at an increase in cost.

The footings of this house are all poured stone concrete, while the cellar and foundation walls are constructed of high test concrete block, laid up in Portland cement mortar. The cellar floor and the garage floor are both 4″ concrete slabs laid over 6″ of porous fill.

The chimney, which contains the heater flue and the fireplace, is built of hard burned common brick laid up in Portland cement mortar. The flue linings are of terra-cotta. The fireplace has a fire brick lining and inner hearth, a built-in cast iron damper and a slate facing.

The porch floor is a colored concrete slab, marked off in pattern shown.

The framing of this house is all of Douglas fir or spruce, and is properly designed and engineered to last indefinitely, and the room sizes are such that stock lengths and sizes of timber may be used without waste.

The exterior walls are sheathed diagonally with tongue and groove sheathing, covered with heavy waterproof building paper, and finally with wide waterproof plywood siding or with asbestos siding, if desired.

The roof is likewise sheathed with tongue and groove boards, over which the heavy 30 lb. roofing felt is applied, and finally the roof is shingled with either asphalt shingles, wood shingles, or slate, as preferred. The slate, of course, is the most expensive, but is fireproof and will last a lifetime.

The exterior trim such as cornices, soffits, porch work, door and window trim, and shutters, is all of clear white pine.

The inside walls of the recessed porch are sheathed vertically with pine board and batten sheathing.

The windows are stock double hung wood windows, and are equipped with bronze interlocking weatherstrips.

The exterior doors are flush veneer type, with small glazed panels.

All interior walls and ceilings are plastered three coats over heavy metal lath. The walls and ceiling of the garage, the ceiling of the cellar and the porch ceiling have two coats of cement plaster, also over metal lath.

The interior trim is all stock moulded pine, painted, and the interior doors are flush veneer birch, which may be painted or left natural, as desired.

The finished flooring is selected tongue and groove red oak laid over 30 lb. felt.

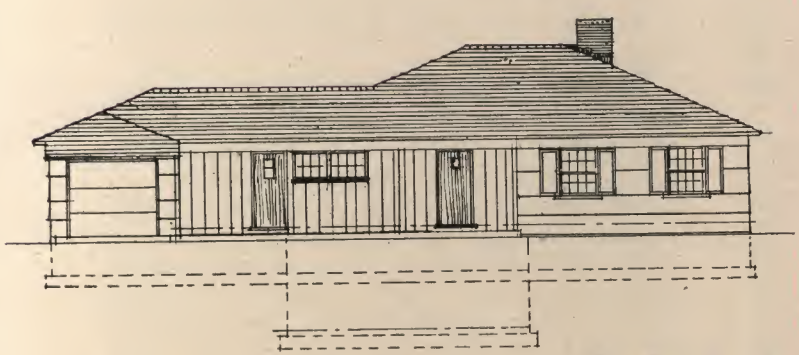
The kitchen and workroom have asphalt tile floors, and stock pine cabinets, with linoleum counter tops and metal edge strips.

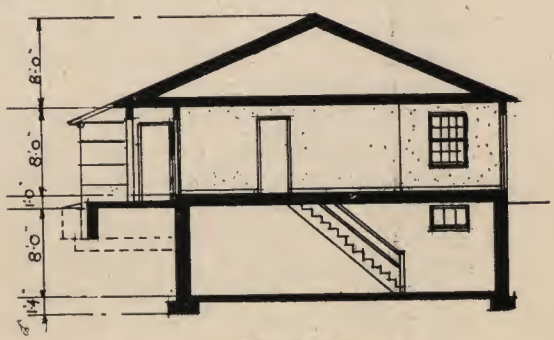
The bath and toilet have ceramic tile floors, and 6′ high glazed tile wainscots.

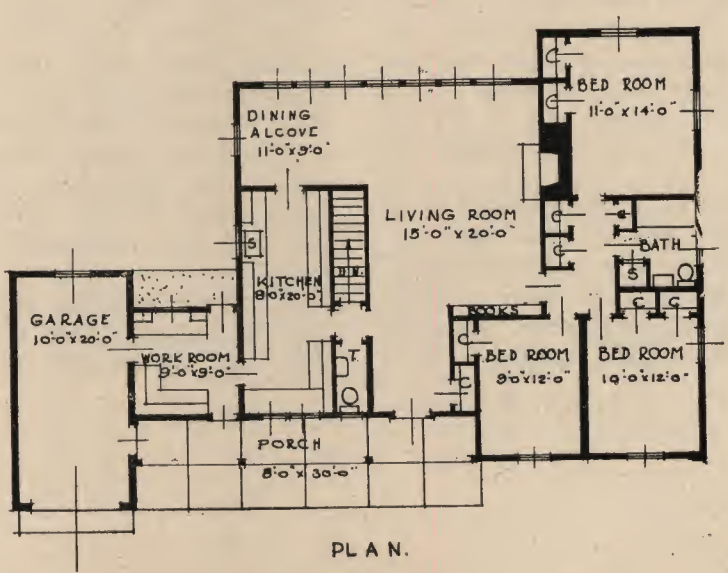
Either steam, hot water or warm air may be used to heat this house and any type of fuel, either gas, oil or coal may be used.

10. SAGADAHOC 34,254 cubic feet. Including living room, dining alcove, kitchen, workroom, toilet, three bedrooms, bath, garage and partial cellar.

Complete working plans
(with specifications incorporated) $15.00
Duplicate Set 5.00







11 MILK HOUSE AND MILKING PARLOR

Farmers operating dairy farms and selling milk are now required by the various State dairy control departments, as well as the commercial organizations, to not only maintain a very high standard of milk, but to provide proper milk houses, meeting strict sanitary standards.

These milk houses must be constructed of durable materials and in such a manner as to be thoroughly cleaned, disinfected, and ventilated.

Owners of large herds forced to build new milk houses, have also seen the value of installing the new labor-saving milking equipment available today.

For a large herd the direct pipe line milker is the most efficient, and as the milk is taken directly from the cow and is not touched by human hands or exposed to the air from the time it leaves the cow until it is fed into the can, the product is of the highest quality.

Customers, of course, are not only demanding this treatment, but are extremely interested in the source of their milk supply, and the manner in which it is handled.

Many farmers whose dairy barns are near a highway have found that it pays extremely well to provide facilities for the public to watch the milking process.

The milking room shown here is typical of the installation now being provided for this purpose.

It will be noticed that through the large observation windows the observer may see the cows as they come into the wash stalls, where the animals are thoroughly washed with warm disinfected water, and then see them come into the milking stalls.

The operator stands in a milking pit 2′6″ below the stall floor.

The cow is then fed the protein supplement, and while consuming this, the milker attaches the sterilized teat cups, and the milk flows through stainless steel pipes and filters direct to the milk house, where it is fed into sterilized cans, sealed, and placed in the mechanical coolers, without ever being touched by human hands.

The milk in cans is then shipped out twice a day by milk trucks operated by the large dairies.

The design shown here may be attached to any existing dairy barn. The milk house and milking room are of frame construction, with concrete floors, pits and foundations.

The exterior is covered with asbestos siding, and the roof is shingled.

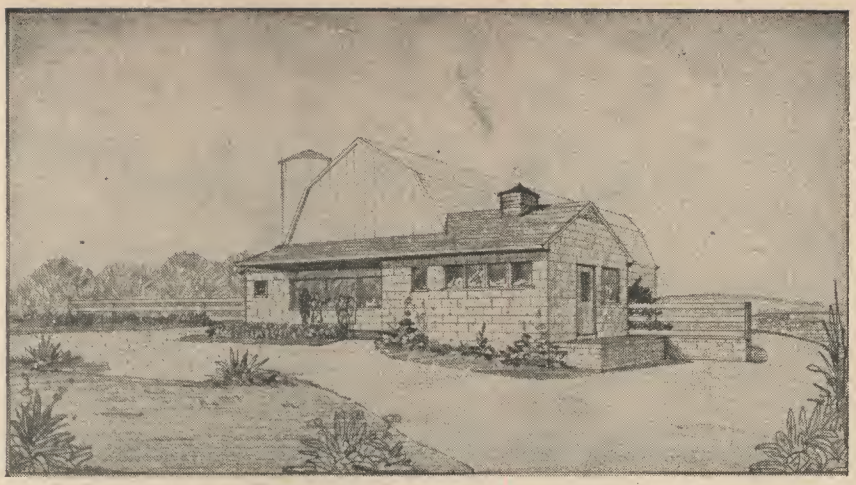
The interior walls are covered with white, glazed asbestos board, which is easily washed down and kept clean and sanitary. All bases are coved and the doors are flush constructed, and have flush metal trim.

The lighting fixtures are all recessed flush with the ceilings, so that no dust or dirt can accumulate on them.

The wash stalls and milking stalls are standard stock metal tubular type, obtainable from all reputable equipment concerns.

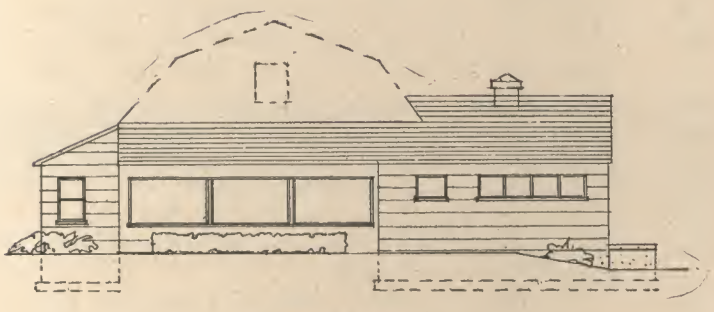
The milk house is equipped with an automatic can filler, can racks, a mechanical cooler, can washing sinks, solution cabinet for teat cups, record sheet holder and a can hoist.

There is a separate wash room or lavatory for the operators, and a small room for the hot water heater and compressor.

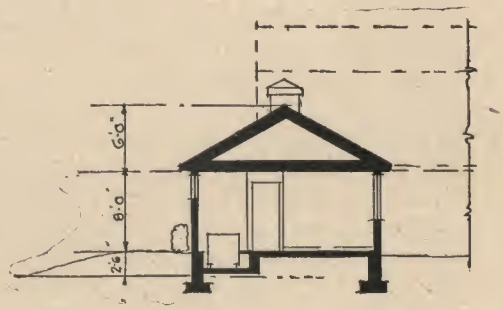


11. MILK HOUSE and MILKING PARLOR 15,120 cubic feet.
Including wash stalls, feed room, milking parlor, lavatory and milk house.

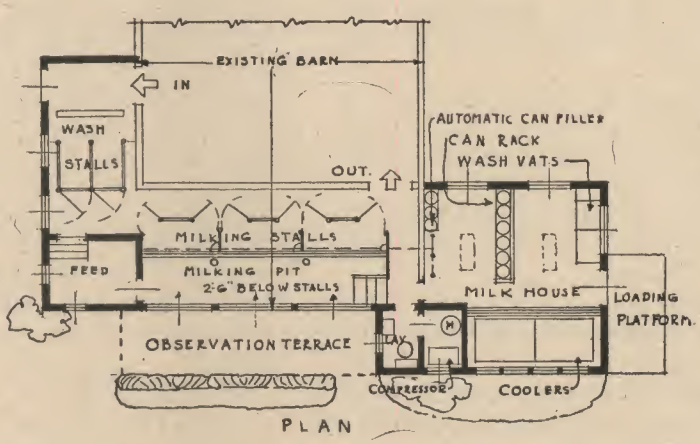
Complete working plans
(with specifications incorporated) $15.00
Duplicate Set 5.00



ELEVATION



SECTION



PLAN

PARKING

12 POLE BARN AND MILK HOUSE

The dairy barn and milking parlor shown here, together with the modern milk house, is one of the latest ideas in the operation of a large dairy herd.

Many dairy farmers have found that hours of daily labor and many dollars can be saved each day by the combination of "loafing" barn and milking room.

Many experiments have been conducted with herds using the old style stanchion barn, where the cows are brought in and tied up in individual stalls, and using the new type of loafing barn where the cows remain loose until milking time.

The animals feed themselves at the feeding fence, which is moved back as the hay is consumed.

This type of barn reduces labor costs from the start, as it is of pole construction, sheathed vertically on the north and west sides, and open on the south. And it continues to save labor costs.

The hay is brought in and stored behind the feeding fence by tractor drawn equipment. There are no hay lofts to fill or climb to, no carrying of hay to individual mangers.

The animals get their ensilage from outside feed bunks which are filled direct from the silo, by overhead feed carriers.

There is no manure to be cleaned daily as in the case of the stanchion barn.

The cows soon learn to come to the milking room at milking time, where they are washed, fed their protein supplement and milked. They then return to the loafing barn by themselves.

The milker stands in a pit, the floor of which is 2′ 6″ below the floor of the milking stall. The udders are at the operator's shoulder level, an easy working height.

The milk is fed directly through sanitary stainless steel pipes to the automatic can filler in the milk house.

The milk house contains the can filler, can racks, can washing equipment, and mechanical cooling tank.

The barn itself is of pole construction. That is, the frame is made with pressure treated poles set in the ground and is sheathed vertically with tongue and groove sheathing.

The milking room and the milk house are of concrete block construction with concrete floors. The stalls in the milking room are standard tubular steel type.

The roof of the building is of purlin construction, with tongue and groove roof sheathing, covered with asphalt shingles.

The bedding is kept right in the barn. Ample clearance lets one use power manure-loaders and clean the barn only once a year. Doors and the open front make it easy to drive a tractor and spreader any place.

Because hay storage is on the ground, space is gained as winter advances. As the hay is fed out, there is more room for cattle or for equipment.

The pros and cons of the loose-housing system for dairy cattle aren't worth arguing. It saves labor and reduces cow injuries.

In this new barn, one man does the milking of 30 cows in an hour and 50 minutes from the time he enters the barn, until he leaves with the equipment and floors all cleaned up.

Other daily chores take a total of one man-hour per day. That is for feeding hay and silage, and scattering straw.

The only big chore is cleaning the barn in the spring. That takes two tractors and two men four or five days.

A Michigan State College survey of 100 farms with stanchion barns showed the average farmer spending 120 hours per cow annually feeding her, cleaning the barn equipment and doing other odd chores. This barn takes only 60 hours.

The survey also showed that the average dairyman, after paying himself wages of 75 cents an hour, showed a net profit of only $10 per cow in 1948. By saving 60 hours per cow, at 75 cents an hour, it is possible to make five times that.

With the front of the barn open to the weather, the temperature in the barn is little above the outside temperature. But even at 5 below zero production is not affected.

The cattle do not huddle or seek a warm corner. They lie on the warm pack of manure perfectly contented. Very little snow drifts through the open south side.

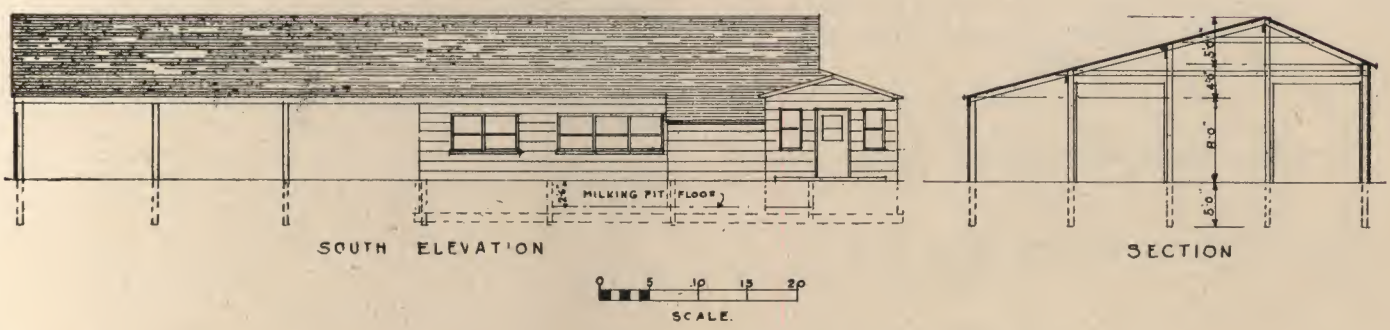
The barn is the final step needed to bring the dairy-farming industry up to date.

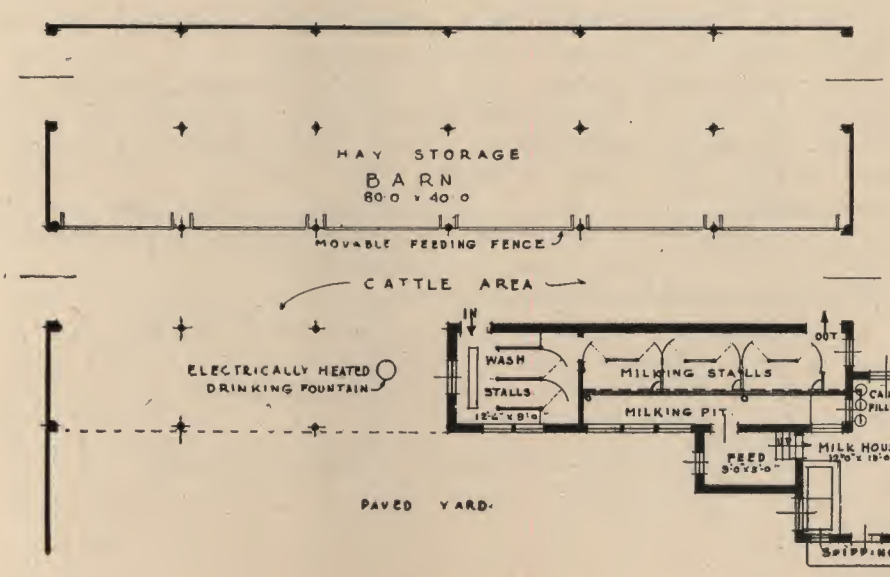
12. POLE BARN and MILK HOUSE **56,000 cubic feet. Including barn, wash stalls, feed room, milking parlor and milk house.**

Complete working plans

(with specifications incorporated) $15.00

Duplicate Set 5.00





13 COMBINATION BARN

Here is a design for a combination barn that offers about everything for the average farm which does not specialize in dairying, or hogs, or sheep, or poultry.

There is a stanchion type cow barn which will tie up eight cows. This will assure a daily production of two cans or 80 quarts of milk per day.

There is a beef cattle section equipped with self-feeding hay bunks and silage bunks, capable of caring for a herd of 20 beef cattle.

While the tractor is rapidly replacing the horse on most farms, there are still a great number of farms that retain at least a pair of work horses, and space has been provided here for them.

Should the horses be replaced with a tractor, this space can easily be converted for other uses such as tool storage, poultry, three more cow stalls, a calf pen, or space for dry stock.

Similarly, the beef cattle sheds may be converted for the use of sheep or swine, if desired.

There is ample loft space for the storing of 40 tons of hay above the cow barn. The hay is fed down through hay chutes, conveniently located over the feed alleys.

The footings of this barn are all of poured concrete, and the foundation walls are of high strength concrete block, laid up in Portland cement mortar.

The beef cattle section has a stabilized earth floor and the rest of the barn floor is of concrete. The manure gutters, feed mangers and curbs are all formed of concrete, with sleeves cast in for the tubular steel stalls and stanchions.

The frame of the barn is all of Douglas fir, structural grade, properly engineered to carry the hay load and well braced in all directions. The loft floor is of wood construction, with heavy beams and joists, floored over with two thicknesses of tongue and groove flooring with paper between, to keep dust from dropping through to the barn.

The exterior wall of the barn is sheathed diagonally with tongue and groove sheathing, and then papered with heavy waterproof building paper, over which is applied asbestos board siding for fire protection.

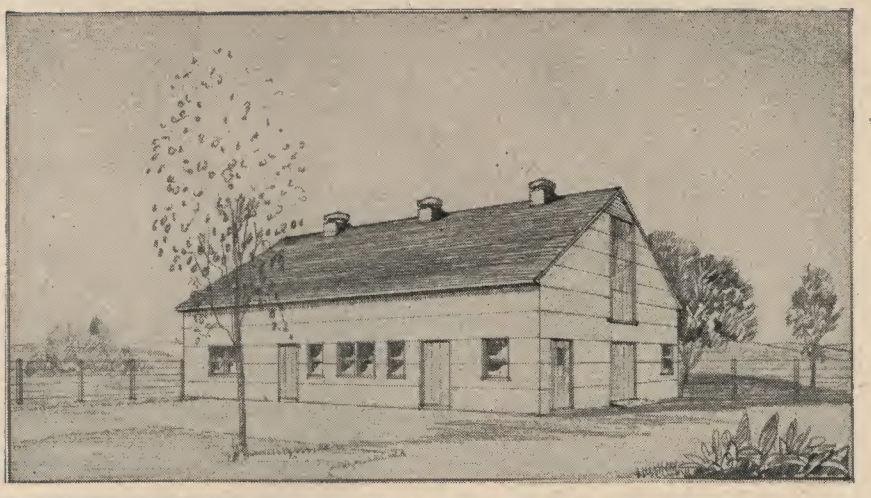
The roof is likewise sheathed with tongue and groove sheathing covered with felt, and shingled with asbestos shingles.

The exterior trim is all of clear white pine, and the windows are stock pattern double hung type, hung with sash balances.

The interior walls and ceiling of the cow barn are covered with glazed asbestos board, and are easy to wash down and keep clean, a very important fact if milk is sold, as the State dairy regulations are very strict on this point.

The feed room contains zinc lined ratproof bins for the storage of feed, and the stair to the hay loft is located there.

This barn, as are all of the other farm buildings in this book, is acceptable for building loans from the Farmer's Home Administration.

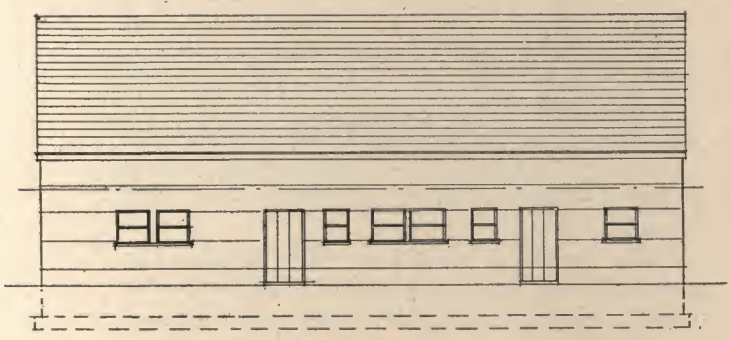


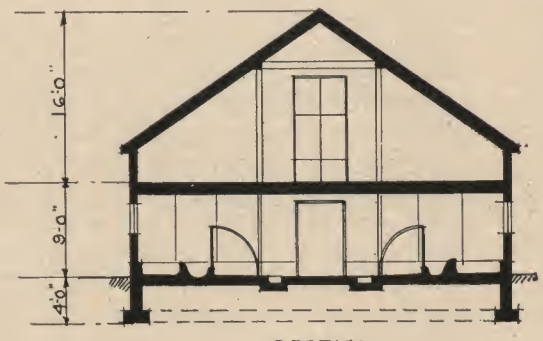
13. COMBINATION BARN **42,000 cubic feet. Including beef barn, cow barn, horse stalls, feed room and hay loft.**

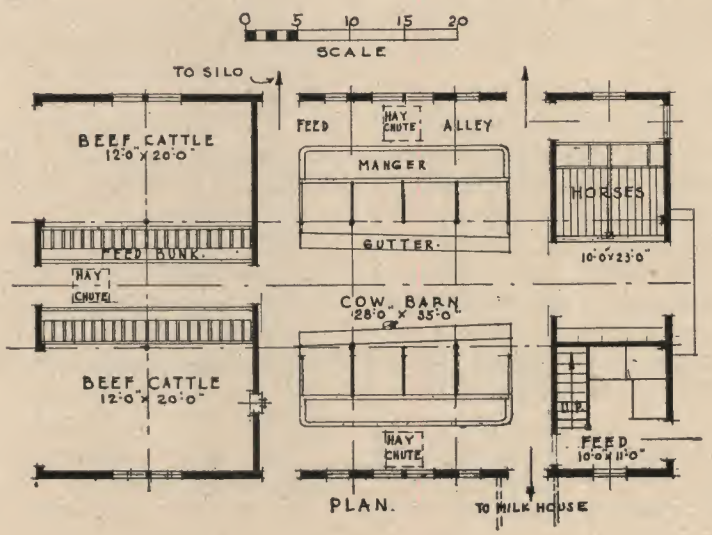
Complete working plans

(with specifications incorporated) $15.00

Duplicate Set 5.00







14 COLONY HOG HOUSE

Hog raising, like every other phase of farming, has undergone many changes in the past 20 years and no longer does the farmer let the pigs grow up with a high mortality rate for each litter.

Pigs, like all other farm commodities, require proper care and proper housing if profits are to be made. Of every 8 pig litter it takes 5 to pay the costs and every pig saved and raised above that is profit. So it behooves Mr. Pig Raiser to see that every pig lives to the point where it can be turned into dollars.

To do this, proper housing must be provided. No longer can the sow just be turned out to pasture with the hope that in the fall the farmer will see a good litter of pigs. In the old days, if the pigs survived it was due to the fact that they could root deep in a straw stack and run fast.

The pigs that survived were left for a year to grow and then penned up for fattening. Fat hogs are no longer bringing top prices, but properly raised meat hogs are, and the hog raiser who wants to stay in business must consider time. Two litters a year, each marketed in 180 days is the rule today—this is really mass production. Feed costs, death rate, infection and many other things, must be considered, the most important being proper housing for the sows and pigs. It is assumed that the wide awake farmer has good broad sows and knows how to feed properly.

Individual houses are all right when the hogs are in pasture, but at farrowing time the colony house shown is the best solution, and if the swine herd is properly managed this house will be used all through the year.

The house shown here will care for 8 litters at a time. It is warm, well insulated, and easy to operate and keep clean. The entire interior can be washed and sterilized, and proper ventilation is obtained by a mechanical ventilation system which eliminates drafts.

Experience shows that when temperature and ventilation are properly controlled, and when the pens are sanitary, large enough, and fitted with pig guards, and the sow and her litter are properly and continuously cared for, the mortality rate is kept at a minimum.

The colony house shown here has poured concrete footings located below frost line. The foundation walls are constructed of concrete block to a point 1′ 0″ above grade.

The floors are of concrete, and are pitched so that each drains into a gutter on each side of the service alley. This gutter has drains which lead the liquids off to a collecting tank, so that this valuable fertilizing material can be saved to build up pasture for the herd.

The building is framed with Douglas fir or spruce properly engineered for a lifetime of use.

The exterior walls are covered up to a height of 3′ 6″ above the masonry line with corrugated asbestos board, inside and outside. Above this, the walls are sheathed with heavy asphalt impregnated insulating sheathing which comes in sheets 2′ 0″ x 8′ 0″ and is economically installed. Over this is applied asbestos board sheets to the roof line.

The roof is sheathed with tongue and groove sheathing, which is first covered with heavy roofing felt, and then with asphalt shingles

The exterior trim, corner beams, cornices, and rake boards, are all pine painted. The doors and windows are stock pattern wood type.

The interior walls and ceilings, above the corrugated asbestos, are covered with flat asbestos board sheets, which may be washed and sterilized.

The walls and ceilings throughout are insulated with 4″ of mineral wool insulation.

The pen walls are covered with corrugated asbestos board, and have metal gates and pig guards to prevent the sow from laying on, and killing the pigs.

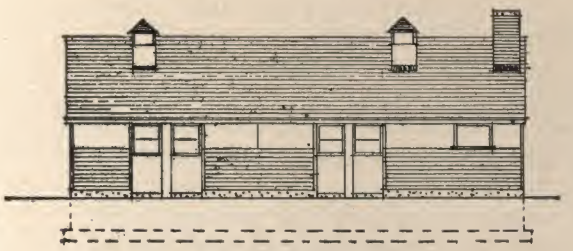
There is an ample feed storage room which is rat proof, and a cooker room for the preparation of food and cleaning of utensils and equipment, near the front door.

14. COLONY HOG HOUSE 19,410 cubic feet. Including pen room, feed room and cooker room.

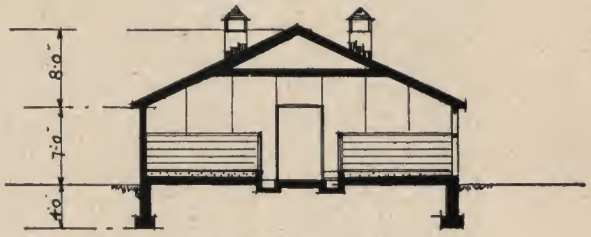
Complete working plans

(with specifications incorporated) $15.00

Duplicate Set 5.00



ELEVATION



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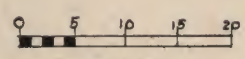
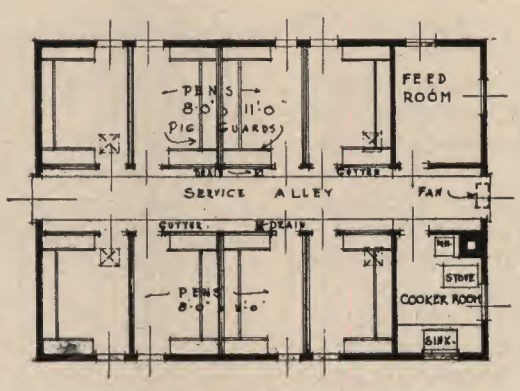


SCALE



PLAN

(*Continued from page* 3)

ing phase, of the proper materials, and the selection of an honest and reputable builder. In connection with this, it is likely that certain parts of the building program will be carried out by the farmer himself, with the help of members of the family and nearby neighbors.

5. Item #4 necessitates carefully worked out designs which may be constructed by country labor, or partially constructed by the farmer.

Another point to be considered is how the financing of the farm building project is to be cared for. Under the new Farmer's Home Administration loan, many farmers will finance their projects with government aid. All of the designs shown in this book are of the type that is acceptable by the Farmer's Home Administration for building loans.

SELECTING THE BUILDING SITE:

If the farm land is not already purchased, consider the following points along with the evaluation of the land itself.

Consider the community in which you wish to raise a family, from the point of view of whether there are suitable schools, churches and shopping facilities nearby; is the character of the community becoming higher or lower, a matter which greatly affects real estate investment.

Be sure that your plot has proper drainage, and try to determine, if possible the presence of rock which would result in an extremely expensive excavation operation. Finally, consider the orientation of your lot, to insure the direction of your rooms as you have them in mind.

COSTS AND BUDGET:

After you have determined your basic plan, assure yourself of a soundly constructed house and safety from legal pitfalls, by securing the services of a good, registered architect, to discuss and develop your ideas.

Then you may obtain approximate estimates and prepare your budget. The cubage method, the most commonly used, is an approximate one, but exact costs can be obtained only by securing estimates from several contractors, based on complete plans and specifications. The same designs will vary in cost in different parts of the country, one of the principal reasons being local labor conditions.

The houses in this book have been cubed, and the calculation of the cost may be based on the figures given. To obtain approximate costs, the cubic foot contents of your proposed house should be multiplied by the prevailing cubic foot costs, this unit probably varying from 50¢ to $1.00 according to locality and conditions.

The cost of the various barns, cattle sheds and other farm structures will vary even more than the residences and no cubic foot value can be determined except by consulting your local builders and material men. Also there is more likelihood of the farmer furnishing a greater part of the labor and material for the service buildings than in the case of the farm residences.

However, to any amount set as a budget, be sure to add a "cushion" or contingency fund, to cover the extra items of equipment which are sure to show up.

SELECTING THE PLAN:

The plans for the residences shown in this volume have been carefully designed, especially for farm living, and are the result of criticism and help obtained from the U. S. Department of Agriculture, in order that the houses shown here would meet with the government loan requirements, and would reflect the latest research in the field of farm dwelling design.

a. Due to modern living conditions, new ideas as to the usage of these areas have resulted in the combined living-dining room, or a living room with dining alcove, which may serve also as a study area. To obtain the maximum sunlight and air that are so desirable for this part of the house, these rooms should face the south.

b. Kitchens:
Kitchens today do not need to be the large rooms that were once required. Modern equipment is so compact that it fits into a much smaller area, yet gives all the preparation and cooking space needed for the average family. An additional advantage is the elimination of many steps. In connection with the kitchen, a farm workroom is practically a necessity in every farm dwel-

ling, as those who know farm operation will recognize.

c. Sleeping Areas:
Keep in mind proper wall space, plenty of light and ventilation, convenience to bath, and enough closet space when planning the sleeping rooms.

d. Basements:
With modern heating equipment eliminating the necessity for basement or cellar, the trend today is away from them, thereby avoiding its cost, if possible. The walk-in freezer and underground bulk vegetable storage facilities, have largely supplanted cellar storage.

e. Garages:
While some designs show attached garages, it is generally assumed that a central motor vehicle building is provided for elsewhere on the farmstead.

CONTRACTS:

While there are several types of contracts used in the building business, the forms used mostly are listed below in order of preference. In any case, be certain to obtain competitive bids from at least three reputable contractors before making your decision.

a. Lump Sum Contracts, in which the contractor names a fixed sum for the completion of the work according to the plans and specifications.

b. Cost of the Work Plus a Fixed Fee, in which case there is a set price for the labor and materials plus a set amount of fee.

c. Cost Plus System, in which there is no set price for labor and materials, and which involves considerable trust in your contractor.

One of the biggest pitfalls in the entire building program is what is known as "extras". Even wth a water-tight, lump sum contract, an owner very easily can let himself be talked into changes here and there during the progress of the work for which the contractor bills him in addition to the contracted sum. Be sure to have any change agreed upon, with the cost in writing, before allowing the work to proceed.

FINANCING:

When making application to your local bank, saving and loan society or insurance company, which is the first step in financing, you will be required to produce the following three documents:

1. A description giving the location of your lot, and proof of ownership.
2. A set of building plans with materials clearly designated.
3. A bona fide contract estimate from your builder on how much the house will cost.

Now you are ready for F.H.A. (Federal Housing Administration) approval. When the plans are submitted to the F.H.A., they charge a fee which is applied to the owner's account if the loan is granted. Private lending organizations, however, examine and make their own approval. The F.H.A. does not lend money directly but guarantees the money the bank lends you. Therefore the F.H.A. wants proof that your lot is a good investment and that your house is well planned and well built. To enforce their standards, appraisals are made and supervision given to the project.

As lending institutions base their rates on different factors, the interest on mortgage loans varies. Generally speaking, however, when you borrow at an interest rate of 4½% on a twenty-year amortized loan, you will pay back $6.33 a month for each thousand dollars you borrow. For example, if you borrow $5,000, your monthly payments will be five times $6.33 or $31.65. To this the bank will add the monthly charge of your taxes and whatever insurance you place on your house.

In construction loans, the contractor is paid in partial payments after he has completed a certain percentage of the house. Some lending organizations make a special charge for a new house loan to cover the risk and service.

Before making a final commitment, be sure you understand all conditions and payments. Your local bank will supply you with a table of loans and payments according to their interest rates, from which you can determine how much to borrow according to your own financial budget.

In addition to the above, consider the very liberal terms offered by the Farmer's Home Administration. This is not to be confused with the foregoing description regarding the Federal Housing Administration. It is a separate government agency administered by the U.S. Department of Agriculture.

PRACTICAL SUGGESTIONS FOR BUILDERS

No single view of the farm-structure field is likely to be a correct one. The structure needs themselves are regional and thus are influenced by a great many variables such as climate, crops, markets, building materials, local traditions, and social and economic patterns. How one interprets these variables in relation to structures will depend to a considerable extent on his special farm interests. Therefore, the plans in this book are devised to cover the over-all features of farm buildings. Changes necessary to make materials fit regional influences, local traditions and social and economic patterns are taken into consideration. The builder may change materials such as roofing, siding, insulation and interior wall finishes without changing the design of the structure.

However, if he desires to make changes in the heating, plumbing, electrical wiring and space allotment, he faces the problem of seeking professional advice.

It is generally conceded that when a builder has selected a plan for a structure, he still has nine classifications of materials, including equipment, to consider carefully before he moves on the job of constructing a building. These classifications are heating, water, electricity, insulation, roofing and siding materials, windows, paints, wall coverings, and floor coverings. The builder will find that even though the bill of materials which accompanies his plans calls for specific types of each of these classifications, there are substitutions which are equally as good, and perhaps more suitable to both his pocketbook and local availability.

The following lists the leading products for each of these classifications.

The Building Heating Unit

The kind of fuel you can command, both from the point of view of price and local availability, will pretty well dictate what type of heating unit you should install. In many rural sections the central heating, or pipeless furnace system, is used. Heat rises from a central location; thus, in a small house the system may be satisfactory, while in a big house it may leave corners, or even rooms, that aren't comfortable at any time of the day. This pipeless furnace, however, has one advantage. . . it can be set for gas, oil, wood or coal. Refinements on this type of single-outlet heater or furnace, such as the installation of warm and cold air ducts, will give the builder additional comfort through more efficient distribution of heat. These refinements make the cost of the home a little higher.

Where electricity is available, the forced-air furnace (with a fan to drive warmth into every corner) is a good answer to the heating problem, but electricity is expensive in certain sections of the country. The electric heating system of the gravity type is also effective. However, the fan will give better heat distribution.

Stokers, though dependent upon current, are a refinement for the coal-burning furnace. Hooked up with thermostats and ash-delivering units, the stoker-fed furnace needs little tending.

Naturally, if you want completely automatic performance, oil and gas are best. The choice between hot water or steam and warm-air systems seems more a matter of local practice than difference in good heat delivery. Naturally, the cost of installing systems using water pipes is much higher.

The radiant heating system whereby heat is conducted through floors and walls, owes its popularity to the fact that it contributes greatly to cleanliness and space. It has no heat-distributing unit to take up a portion of the floor or wall of every room in the house. The furnace, itself, may be installed in a closet, workroom or garage, thus eliminating the basement if one desires.

Water Supply and Plumbing

Pumps and watermains should be chosen on a capacity basis. Your dealer will be able to tell you about the water supply of your vicinity and should be able to show you a table which will give you the average number of gallons of water needed on your farm, figured on the basis of human needs, stock and crops.

Whether you use a flow reservoir, windmill, fuel-driven pump, or a pump powered by electric current will depend upon the lo-

cation of your farm and how much you wish to spend. Depth of well and carry of pipe, atmospheric pressure and pipe friction will present another set of standards. The essential factor is that water be piped to the kitchen, bathroom and other service outlets of the farm.

Don't tackle house plumbing without the advice of a person acquainted with the field, and regardless of whether you do the work yourself or hire someone to do it, see that a valve is placed in each branch line so you can shut off any particular fixture without shutting off the whole plumbing system.

Don't skimp when you buy plumbing fixtures; get only those of high quality. The small additional cost of high quality fixtures is repaid through more years of service.

Electricity For Power and Light

When you wire your farmstead, wire for every possible need you may have in the way of current capacity. Current is like water in a pipe; if the pipe is small the water output is small. In addition, current flowing through a too-small wire heats that wire through resistance and may cause a serious blaze.

The wires from the central distribution point to the home should be of such size that the voltage drop at maximum load will not exceed 2 percent of the voltage at the point where the power company's wires join yours. Call in an electrician for this job. Also, let him provide special heavy-duty circuits and outlets for electric range, water heater, power saws, large motors, elevators, etc. Tell him to put in plenty of outlets.

Choosing The Insulation

The three most common types of insulating materials are fill, blanket and board. Their insulating value cannot be judged here because they are governed by their use and installation. In a remodeling job where it is not practical to remove either siding or interior wall covering, fill insulation is the only answer.

Where some structural rigidity is desired along with insulation, the hardboard variety is good.

Where insulation must be wrapped or stuffed around the corners, the blanket type is best. This type is also known as "batt" type.

Some manufacturers use vapor papers to back blankets; others form the blankets so they are full of air pockets when extended. Insulation experts readily agree that an air space between outer walls and insulating material aids greatly in keeping a building warm in the winter and cool in the summer. This space should in no case be less than 1 inch.

The prominent insulating materials are rock wool, fiber glass, aluminum foil, cotton, cork and fireproof papers. When buying insulation of any type, make certain it's reasonably fireproof.

Roofing and Siding Materials

Though most house plans call for specific roofing and siding materials, architects are aware that some builders will desire to use products other than those specified so usually draw their plans with the changes in mind. The builder, however, should be careful in choosing other materials. First, because we have come to identify certain roofing and siding materials with specific types of architecture. The builder who makes a radical departure from design by changing the appearance of his building's roof and side walls may be disappointed with the effect when the job is finished. Also, each type of roofing or siding material has its limitations. Some materials, and even better grades of the same product, though the initial cost is higher, yield a far better return on the investment by affording longer life and increased protection.

The slope of the roof is the most important consideration when a builder decides to apply materials other than those called for by the plans. The first step is to determine the right material in relation to the pitch. Table I shows how to pick these materials. Check this table closely before applying any material other than that recommended.

Roofing and siding varieties usually found on the farm are: wood, composition, asphalt, asbestos, steel and aluminum.

Most of the wood shingles and siding materials used today are of Western red cedar. Other woods used to a smaller extent are redwood, bald cypress and Eastern white cedar. The heartwood of these species is resistant to decay. Wood remains an important roofing and siding material because it is

light in weight, has excellent insulating properties, and can be colored as desired. It may also be treated to prevent warping and fire.

Composition roofings, stone or slate surfaced, are easy to apply and are fire-resistant because they usually have asphalt saturated bases. They generally come in rolls and may be used as siding material.

Asphalt roofing and siding shingles are made from a base of dry felt, usually processed from rag, wood or other cellulose fibers and saturated or coated with asphalt. They may be surfaced with mineral aggregates or the so-called "mineral surface" products, such as mica and talc or slate. They'll resist the spread of fire due to flying brands, so fire insurance premiums on buildings covered with them are relatively low. They come in a wide range of styles, textures and colors. Their first cost is low, they require no paint or stain, and they're easily applied and maintained.

Asbestos shingles are generally a combination of asbestos fibers and Portland cement. They are equally adapted for use on new buildings or for application over old roofs. They offer fire protection, low maintenance, beauty and economy. They contain nothing that will burn, are immune to rot and decay, do not need painting, and will last indefinitely unless broken on impact.

Steel or aluminum in the form of corrugated or V-crimped sheets are practical for general roof and siding use. A good steel roof will last a lifetime with proper care, which means it should be adequately grounded against lightning and be painted when indicated.

Selecting The Windows

There are many types of ready-made windows on the market today so it hardly pays the builder to make his own sash and frames. Architects draw their plans to standards set up by leading window manufacturers, so see your dealer when you're buying. He'll tell you what type of window is best for each farm building.

Paints and Painting

There are many types of paint products on the market—paints for inside and outside wood coverage, cement paints, metallic paints, calcimine paints, water resistant paints, lacquers, varnishes, stains, and many others. Research has developed improvements in all paint products. Outside paints are more resistant to weather than ever before; inside paints have improved covering qualities and "one-coat" products have been introduced. The difference between outside, inside, dull-finish, semi-gloss, and gloss finishes is largely a matter of formula, but all fall into the broad classification of oil base products.

Lacquers have a liquid plastic base that dries and hardens quickly after application. They are not recommended for many types of painting.

Oil resin paste products are quite popular for interior decorating because they may be reduced to the proper consistency by the addition of water. They also provide a water resistant surface to both inside and outside masonry walls. However, the purchaser must definitely state the purpose for which he will use the oil resin paste paint if he wants the type considered best for the job.

Stains and varnishes have as their primary uses the finish of furniture and woodwork, but revolutionary shades of stains have been developed for roofing and siding shingles.

For metal surfaces, in addition to the oil base paints, aluminum and chromate products are available. These may be used either as a prime coat or as a protective covering to prevent corrosion.

Exterior and Interior Walls

Milled wood is still the most popular of exterior wall materials and the easiest to obtain. It may be applied by the amateur, looks right, and is one of the strongest materials for its weight. It comes in boards of standard lumber grades and may be applied, horizontally, diagonally or vertically, depending upon the use of the building. Boards may be square-edged, shiplapped, tongued and grooved, or tongued and grooved and end-matched.

Bevel siding, or "lap siding" as it is sometimes called, is the most popular type used in house construction. Standard widths are 4, 5, 6, 8, 10 and 12 inches. The 8 inches and wider are called "bungalow" or wide Colonial siding.

Drop siding and Rustic siding are most frequently used on farm buildings where sub-sheathing isn't employed. Drop siding

has tongue and groove joints, more structural strength. Rustic has shiplapped joints.

Vertical wood siding usually consists of matched boards 8, 10 and 12 inches wide, or of random widths, the joints of which may be shiplapped and moulded, matched with V joint, or covered with battens.

Flush siding is dressed and matched boards laid "flush" against the sheathing. The builder can obtain unusual styles of siding, such as a thick type made to give the appearance of logs.

Concrete, either solid or in blocks, makes a good wall, but the amateur would be wise to call on a professional to lay it up. It must be properly reinforced, the same as brick, tile and other types of masonry walls. Brick has other disadvantages, such as being costly and often hard to obtain in the local area, but bricks make the best of farm structures. Hollow building blocks, commonly called "tile", have great insulating value, are lighter than concrete or bricks in surface weight, but do not have tensile strength necessary for buildings that must house heavy equipment.

Steel is one of the best possibilities for exterior walls because it's permanent and impervious to vermin, but it is a poor insulator and must be backed by some form of insulating material when applied to buildings where comfort is imperative.

Asbestos fibers and cement in smooth precast sheets also has good insulating value and maintenance is comparatively low, but the first cost is higher than many other types of siding. Various thicknesses are made, so the material is suitable for both outside and inside coverage. Sheets may also be purchased in corrugated form to give strength.

Interior walls of homes are now being covered generously with gypsum lath or plaster board, a fireproof, dry wall, porous sheet with high insulating value. Other interior finishing materials are building boards and tiles, many with enameled surfaces.

Plaster costs much more than dry wall construction but is more permanent and better all around as a wall material. Properly applied, it will not buckle or shrink.

Floors and Floor Coverings

Hardwood flooring is made principally from oak, maple, beech, birch and pecan. Softwod flooring is made chiefly from fir, Southern yellow pine and Western larch. Most lumber yards carry one or two of each type in stock. The builder may also purchase pre-finished hardwood flooring.

For coverage of farm floors, wood, linoleum, rubber, cork, tile, and various compositions of a plastic nature are available. Wood may be had in plank, strip, block or prevarnished units. Linoleum may be purchased in rolls or in tile form. Concrete is best as a basic floor for a basementless house, for it may be covered with any one of the many types of commercial floor coverings or it may be painted. Asbestos-cement tiles are recommended for concrete floors, but they also serve well on wood floors when underlaid with felt. An asphalt-impregnated tile is also available.

FARM BUILDING REQUIREMENTS

The U.S. Department of Agriculture has prepared a set of functional requirements for every type of farm building. Also, there are simple but important changes to be made in housing livestock. Before you erect any structure make certain your plans meet those requirements. We list here the requirements for housing cows, chickens and hogs.

Building The Dairy Barn

A good dairy barn should provide: (1) conditions favorable to the productivity, health and safety of the animals; (2) all necessary sanitary safeguards for the production of milk; (3) facilities and arrangements for economical use of labor; (4) safe, healthful, conditions for workers.

The effect of winds, lightning, termites, heavy snows and unfavorable temperatures are important factors in design of the dairy barn. Special conditions are necessary to protect the buildings from deterioration resulting from operation or service uses, fire, rodents and dampness.

LOCATION—The dairy barn should be located on a well-drained site to the leaward side of the house, away from other buildings. This site should provide a means of disposing of waste water. The long axis of the barn should be north and south, except

for open pole types of loafing barns and solar-type barns, which should run east and west with south sides open or closed with "Thermopane" glass.

STABLE ARRANGEMENT—When less than 10 cows are kept, stalls should be in a single row. Stables for more than 50 cows should be divided by a cross partition near the center to reduce drafts and brace the building. Cows should face out so manure will not splatter the walls. When cows face in, feeding is easier, but tests prove more labor is required to milk and clean the barn.

ENVIRONMENT REQUIREMENTS — Stable temperatures should not fall below freezing. Relative humidity should not exceed 75 percent except on extremely cold days when 85 percent or more must be tolerated. Dairy cows produce most efficiently in northern and mid-western states when temperatures range from 35 to 50 degrees. Cows in coastal states and inland Southern states produce most efficiently when temperatures are 45 to 60 degrees. In areas having six or more hours of winter sunshine daily, windows and doors effectively ventilate stables. In other areas a special ventilating system is needed. The mechanical fan system is the most reliable. Inlets for air should be uniformly spaced around the stable, but not within five feet of an outlet flue or a corner of the building. Inlet flues should be insulated on the warm side.

FLOOR SPACE — The length of stalls should be varied to accommodate large and small cows. The width of the stall should be adjusted to the size of the cow, but no stall should be less than 3'6" wide. Four feet is a better width.

Pens: If only one or two pens are provided, they should have a minimum size of 12 x 12 feet. When more than two pens are provided, they should vary in size according to the size of the animal.

Bull Pens: 10 x 12 feet to 12 x 16 feet, with partition height 5 feet, 3 inches.

Test Cow Pens: 9 x 10 feet to 12 x 12 feet, with partition height 4 feet, six inches.

Maternity Pens: 10 x 12 feet to 12 x 12 feet, with partition height 4 feet, six inches.

Individual Calf Pens: 4 x 6 feet to 6 x 6 feet, with partition height 3 feet, 9 inches.

All pens should be equipped with floor drain, water bowl and light outlet. Slatted and wire platforms raised several inches above the floor are recommended for calf pens.

WATER REQUIREMENTS—A minimum of 15 gallons of water per day for each cow. When storing water, allow 1.5 cubic feet of storage space per day per 1,000-lb. cow.

Dairy Calf Barn

There are many objections to housing calves in the dairy barn, some of which hinge on the health standpoint. In most dairy barns cattle face outside walls, so a driveway down the center is provided. This means the barn doors have to be opened wide regardless of the weather, so calf pens are usually adjacent to strong drafts. Sudden drops of temperature in the fall and winter are responsible for the loss of many promising calves. In addition, calves can be kept fairly comfortable in the dairy barn during the day, even in hot weather, but when the cows are brought in to be milked at night, the temperature is boosted many degrees by the heat given off by their bodies, with the result that calves become overheated, especially in humid weather. A calf barn offers the best solution for keeping calves out of drafts.

The calf barn should be built to face south. Windows should be large enough to permit the noonday sun to reach far back in the pens. Pens 8½ x 10½ feet will each take care of four to five calves from the time they are brought out of the maternity barn until they are three to four months old. After that, the number per pen should be cut down.

Safe Bull Barn

Careful studies indicate that the bull needs only protection from fire, wind and rain. Therefore, any fire-proof building that is strong enough to control him will do for quarters. The pen itself should be at least 12 x 12 feet and equipped with a sturdy stanchion, feed manger and water bowl. A separate alley is recommended, so feeding can be done without going into the pen. If possible, attach the bull barn to the dairy barn so the feed storage space is handy.

A paddock should adjoin the bull barn so the animal can get exercise. Studies show that a bull gets more exercise in a long narrow paddock than in a square one. A satisfactory width is 20 feet, if the length of the yard is at least 60 feet. Lay out the paddock

so there is an unobstructed view of the pasture from it. The bull will remain gentler if he can see the cows.

The paddock fence must be sturdy. Native cut or dressed 2 x 6 or 2 x 10 planks are satisfactory, when bolted to posts placed eight foot on centers .Allow six inches between planks when using the 2 x 6.

The bull barn does not require a door if the doorway faces away from the direction of prevailing winter winds and if the roof has some overhang.

The Milk House

The milk house should be located on well-drained soil adjacent to the milking barn. Some localities require that the milk house be separated from the barn, but if this is a requirement in your area, the chances are you will be permitted to construct a breezeway between the milk house and the barn. In areas where there is no objection to attaching the milk house to the barn, a ventilated passageway, equipped with automatically closing doors, is usually required. These doors must be arranged at both ends of the passageway so they cannot be opened at the same time.

Health codes permit any type of smooth impervious flooring in a milk house. The most acceptable type is the concrete floor, which is usually laid with a slope of ¼ to ½-inch to the foot. The slope must be toward a drain. Steel trowel finish of the floor is required.

It is not necessary to seal the ceiling of the milk house if the roof is constructed with a tight deck. If the roof is of corrugated metal, asbestos-cement, or other products erected on open-spaced boards, a ceiling is mandatory. Materials used on sidewalls and ceilings should be smooth, easy-to-clean, and be as free from cracks as possible.

All openings of a milk house must be screened.

Buildings For Poultry

Basic requirements for poultry houses have been set up by the National Advisory Council. The functional requirements are:

FLOOR AREA—3 sq. ft. per bird for smaller types like leghorns; 3¼ to 4 sq. ft. for heavier types. If the use of the yard is possible the year around, allow 2 to 2¼ sq. ft. per bird.

TYPE OF FLOOR— Ground floor should be concrete laid over gravel fill. Upper floors should be double layer of wood with insulating felt between.

INTERIOR WALL SURFACES—Lower 3 ft. of walls and for 2 ft. above perches should be of smooth, peck-proof material. The entire surface of walls and ceilings should be light in color. Ceilings should be 86 inches or more in height.

ROOF—May be of any design and covered with any material, as long as it is constructed to allow a minimum heat transmission to the interior.

DOORS—Should swing in and contain removable panels to allow additional summer ventilation. One-inch wire netting is suitable screening.

WINDOWS—Glass area can vary from 5 to 15 percent of the floor space, smallest area in the North. Seventy-five percent of the glass used should be in the front of the house with small windows in the rear. Front windows should slide down or tip in. Other windows should slide or hinge on bottom to open in. Screen all windows.

HOUSE TEMPERATURES—No sudden or severe changes. Never let temperature go down to freezing in the winter; never higher than outside in the summer. Optimum is between 50 and 60 degrees F.

VENTILATION — Forced ventilation is positive; the gravity system cannot provide ideal ventilation under all conditions.

INSULATION—Use insulation under roof. Place it in the sidewalls if you live in the extreme North or South areas of the country.

PERCHES—Allow 8 to 12 linear inches of space for each bird, depending on breed. Perches should be 14 inches apart and made of 12-inch material. Top edges should be rounded. Build perches on a removable frame that is covered with 16-gauge ½ inch wire mesh netting.

DROPPING BOARDS — These should be constructed with as few cracks as possible. Build them in removable sections and place them at least 2½ inches from the floor. Dropping boards should have a minimum height of 12 inches in front and 18 inches in the rear. Pits must be covered with 16-gauge 1½-inch wire mesh netting, firmly nailed beneath the perches.

NESTS—These should be 12 inches wide, 14 to 16 inches deep, and 12 inches high. One nest is needed for every 5 to 6 birds. One trap nest to every 3 or 4 hens. The lower tier of nests should be a minimum of 16 inches from the floor.

WATER—Allow 50 quarts of water every 24 hours for each 150 to 200 birds.

FEED HOPPERS—Each bird requires 2 inches of hopper length. Hoppers should be attached to buildings. Arrange them so the birds can feed from both sides.

YOUNG STOCK POULTRY HOUSES — These include brooders, colony houses and range shelters. All are intended for seasonal use in rearing chicks from the day-old stage to first-egg maturity. In general, they are movable types. The floor area of young-stock poultry buildings will vary with size and age of the chicks as follows:

AGE OF CHICK	*FLOOR SPACE FOR CHICK*
1 to 4 weeks	½ square foot.
4 to 8 weeks	1 square foot.
8 to 12 weeks	1½ square feet.
12 to 16 weeks	2 square feet.
16 to 20 weeks	2½ square feet.
over 20 weeks	3-4 square feet.

Buildings For Hogs

Variations in climate in different parts of the United States affect the design of hog houses. In the northern area there are periods of several days or weeks when the weather is too severe for hogs to be outdoors. In the Southeastern States and along the west coast, winter teperatures are moderate and animals can be outdoors much of the time, but must have shelter from cold rains and winds. In the extreme South, protection from heat and against parasites and disease is important. Here are general requirements for hog buildings everywhere:

WATER SUPPLY—Clean drinking water should be accessible for hogs at all times. The quantity consumed daily ranges from ½ gallons for the 25-pound pig to 1½ gallons for the 200-pound hog. A nursing sow needs 2 to 2½ gallons daily per hundred-weight.

METHODS OF HOUSING HOGS—There are two general methods of housing hogs: (1) In movable or individual houses and (2) in central houses. Movable houses are used extensively in all zones because of their simplicity, low first cost per unit, and adaptability to a sanitation program. They may be moved to clean ground and the sow can be placed in them either before or after farrowing.

Central houses are seldom provided for less than six sows. It is especially necessary that a floor be provided for the central house and that all surfaces be of materials that can be kept sanitary.

The practice of confining hogs on concrete is popular in some sections. Some breeders follow the practice from birth to market, while others place the pigs on pasture during the suckling period and confine them on concrete from weaning to market weights.

LOCATION—The permanent type hog house should be located on well-drained soil. The location should be convenient with respect to corncrib, other feed storage, water and pasture. The direction of prevailing winds, which may carry odors toward the house or dairy, should be taken into consideration.

HOUSE TEMPERATURES—A minimum temperature of 40 degrees is required for fattening hogs. The optimum temperature for farrowing hogs is 50 to 60 degrees. Use brooders to reduce the chilling of small pigs. In northern areas a chimney should be provided so that a stove may be set up in the alley or in a vacant pen when needed.

VENTILATION—Electric fans or gravity systems may be used. In northern areas the ventilation system should be capable of exchanging rate of 1,000 cubic feet of air per 300-pound hog. This system should be baffled so that the rate of ventilation can be reduced on cold days. For gravity ventilation, the area of the outlet flue should be 20 square inches per hog. Outlets should be three to five pens apart, with inlets at every other pen, even on each side of a two-row house. Total inlet area should be a little less than the total outlet area, dampers are needed on both inlets and outlets. Place inlets above the level of the pen partitions, with deflectors to diffuse cold air. Gravity outlet ducts should be insulated.

INSULATION—Two major purposes of insulation are to conserve heat and reduce condensation. If the house is to be used for farrowing at a season when the average outside temperature is below 45 degrees, provide for the use of pig brooders or other

supplemental heat. An extra thickness of insulation under the roof or the roof-ceiling combination will assure that if condensation occurs, it will be on the walls, not above the pens.

SPACE REQUIREMENTS—When ten or more hogs are quartered together in a cold area, allow space on the following basis:

100-lb. hogs	5 to 6 square feet.
200-lb hogs	8 to 10 square feet.
300-lb. hogs	11 to 14 square feet.
500-lb. hogs	16 to 20 square feet.

Allow about 25% more for 10 or more hogs quartered in a warm area, and 25% more for space for exercising.

BOAR PENS—Boar pen and outside runways should be larger than those provided for sows of equal weight.

ALLEYS—Central alleys should not be less than 4 feet wide. In central houses 40 feet or more in length, an alley 8 to 10 feet wide permits the entry of a manure spreader or truck. Cross partitions running to the ceiling at every fourth or fifth pen will reduce drafts in long houses.

FEED STORAGE—An 8-by-16-foot storage room provides space for 8 to 10 tons of feed in bins or sacks. One ton of feed lasts 10 sows for one month. Since many hog rations have six or more ingredients, additional space is needed for handling and mixing. Care should be taken to rat-proof feed rooms and bins.

INSIDE AND OUTSIDE PENS — The width of each should be determined as explained under "Space Requirements." The length should be 8 to 20 feet. If outside runs are used as a feeding floor, length of at least 12 feet is desirable.

FLOORS—Should slope at rate of ¼-inch per foot to a shallow gutter at edge of central alley to assure ease in cleaning. Floor surface shold be concrete, even enough to facilitate disinfecting and cleaning but not smooth finished.

PEN PARTITIONS—Should be solid between pens to reduce draft. A 4-to 6-inch curbing 3 to 4 inches wide between pens helps prevent the spread of disease. All edges of curbs should be rounded.

WINDOWS—One window per pen in farrowing house; minimum of 1 square foot of opening per 30 square feet of floor space. In cloudy areas of moderate temperature 1 square foot of opening to 15 square feet of floor area. Windows should be hinged at bottom to open outward. Place shutters on windows in extremely cold weather.

FRAMING AND BRACING

It is important that timber used in framing and bracing a building be of proper dimension. For this reason, architicts carefully insert dimension figures on building plans. However, when the amateur constructs without plans or advice, he will find the following useful in determining what size timber to use for making plates, sills, girders, joists, headers, trimmers, studs and rafters.

WALL PLATES AND MUD SILLS—The wall plate is usually a 2 x 8, though a 2 x 6 may be used. The plate is carried around the entire wall of the building to serve as a base on which to rest the joist on the wall. It is sometimes bolted with anchor bolts that are securely embedded in the foundation wall, but it may also be embedded in the mortor to level out any unevenness in the masonry, hence comes one of its names "mud sills." To estimate the number of lineal feet of wall plate needed, figure the number of lineal feet in the perimeter of the foundation wall.

BASEMENT BEAM OR GIRDER—The outer ends of the joists which support the first floor rest directly on the foundation wall. The inner ends of these joists rest upon girders which are supported by bearing posts. These girders and posts support the main bearing partitions as well as part of the weight of the floors and the contents of the house. As a general rule, basement beams, when made of wood, are 6 x 8, either solid timber or built up out of three pieces of 2 x 8. A built-up beam is stronger than a solid timber. Smaller girders may be used where it is possible to shorten the span. The following table gives the maximum spans for wood girders:

Size in Inches	*1-Story Dwelling*	*1½- and 2-Story Dwellings*
4 by 6	5 ft. 0 in.	4 ft. 0 in.
6 by 6	6 ft. 0 in.	5 ft. 2 in.
4 by 8	6 ft. 4 in.	5 ft. 6 in.
4 by 10	8 ft. 0 in.	7 ft. 0 in.
6 by 8	8 ft. 0 in.	7 ft. 0 in.
6 by 10	9 ft. 0 in.	8 ft. 0 in.

Good construction practice requires that all joints of solid and built-up beams shall be made over the column supports.

BOX SILLS OR HEADER JOIST—These are actually headers placed on the plates at the outside ends of the floor joist. As the outside joist along the side of the foundation should be doubled, the amount of lineal feet of box sills required is the amount of the lineal feet of the foundation wall. Box sills are always of the size of the joist.

JOIST (FIRST FLOOR)—These are horizontal beams supporting floors and ceilings. For short spans they may extend from one foundation wall to another, or, on longer spans they may have one end resting on a foundation wall plate and the other end resting on a girder. Joists are usually made of fir or yellow pine. They range in width from 2 x 6 to 2 x 10 inches, and both their width and length are dependent upon the length of the span they bridge and the load they carry. They are placed either 12 inches or 16 inches on center. Failure to use joist of sufficient size is sometimes the cause of sagging floors and cracked plaster in ceilings underneath.

HEADERS, TRIMMERS AND TAIL JOIST—These are terms used to describe the joist members around an opening that has been cut through the floor construction, such as openings for chimneys, fireplaces, and stairways. Where an opening is cut into floor construction and the header cuts two or more of the main joist, the adjoining joist (the ones supporting the header) should be doubled.

SECOND FLOOR JOIST—If the house is two stories, the estimating is done just the same way as it is done for the first floor. The second floor does not have wall plates, so these are eliminated from the list of materials. In certain localities, building codes require that when platform construction is used the second floor joist must be headed in the same manner as the first floor. In good construction, the outside wall joist on the second floor should be doubled, in which case it is necessary to include box sills in the estimate. In a story and a half house with an unfinished attic that may be finished someday, it is best to use joist that will carry finished floors. However, if there is just a scuttle hole to the attic space, ceiling joist sizes may be used.

CEILING JOIST — Where economy is of first importance, it might be possible at times to get by with 2 x 4 ceiling joist for short spans, but good construction calls for a minimum of 2 x 6. In house construction, ceiling joists are run to form a tie for the roof. Joists are usually made of fir or yellow pine, and are placed on 12-inch or 16-inch centers. To estimate the number needed for each span, take three-fourths the length of the run plus one.

OUTSIDE WALL PLATE — This is a single 2 x 4, known also as the sole plate or shoe, which is laid on the outside of the perimeter of the building. Outside studding are spaced and nailed on it. The plate should be spiked through the subfloor, into the joist wherever possible. On top of the studding are nailed two more 2 x 4 plates, known as the cap plate and the tie plate, which hold the studding in position and tie them together. These top plates should always be lapped and spiked at the corners. To estimate the number of lineal feet needed for outside wall plates, multiply the number of lineal feet in the perimeter of the building by three

OUTSIDE STUDDING — The length of the outside studding may be ascertained by measuring the distance between the top plate and the sole plate. Use the rule of one stud to the foot or one stud per lineal foot of the otside wall, then include 8 lineal feet of 2 x 6 and 14 lineal feet of 2 x 4 as part of each outside door and window unit. Headers over all openings should be doubled and set on edge.

PARTITION PLATES AND STUDS — These are important plates because they help tie a building together. They should be doubled and all joints should be square and true. Whenever a partition wall joins an outside wall, the two top plates should lap one over the other to tie the partition and wall together. Three times the lineal feet of partitions will be the number of lineal feet

of 2 x 4 plates required. This allows one stud for every lineal foot.

GABLE END STUDS—The length of the gable end is determined by measuring the distance between the top of the plate and the peak of the roof. One-half of the number of feet in the width of the gable is the number of studs required.

KNEE WALLS—These are found in the attic and are supports for roofs. In reality, they are partitions. They are erected in roofs where the span of the rafter is unusually long and the size of the rafter not adequate. The knee wall is located so as to provide a 5-foot sidewall on either side of the attic. It is constructed with a single sole plate and a double top plate, and the required spacing is marked on the plan. To estimate the number of 2 x 4 lineal feet required to construct knee walls, follow the same rule as for partitions, or follow the spacing as specified on the plan.

BRACING—In good construction, the corners of a frame building should be braced. A 1 x 4 piece, let in flush with the face of the stud and running diagonally from the upper outside corner of the lower plate, is recommended. Or short pieces of 2 x 4 can be cut between the studs running in a straight line from the upper corner to the lower plate. A set of braces should be used for each story, and if a window opening in the exterior wall interferes with the braces, they should be as long as possible from the corner of the lower plate, just missing the opening. If such bracing is not used, it is suggested that diagonal sheathing be put on at a 45-degree angle.

RAFTERS—These must be of sufficient size and strength to support the weight of the roof, carry the snow load, and resist wind pressures without sagging. The size and spacing of rafters will depend upon the span and pitch of the roof. Rafter sizes are usually 2 x 4, 2 x 6 and 2 x 8. Most rafters are set on 16-inch and 24-inch centers. The number of rafters needed for the average roof is 1½ times the length of the ridge in feet. If this results in an odd number, add one to make it even. Rafter length can usually be scaled on the plan, but if you have no plan, you may determine a single rafter's length from this table:

Pitch	*Rise per Foot of Run*	*Length Common Rafter**	*Hip & Valley Rafter*
1/4	6″	Run x 1.118	Com. Rafter + 34%
1/3	8″	Run x 1.202	Com. Rafter + 30%
5/12	10″	Run x 1.302	Com. Rafter + 26%
1/2	12″	Run x 1.414	Com. Rafter + 22%
7/12	14″	Run x 1.537	Com. Rafter + 20%

* Add for projection of rafter over eave. The length of hip rafters may be determined from the above table. Count the number of hips in the roof to ascertain the number required.

BRIDGING—This is a lateral form of bracing a joist. Bridging is actually short pieces of 1 x 3 or 2 x 2 material nailed at the top of one joist and at the bottom of the next. Two pieces, forming a cross, are nailed in place before the sub-flooring is laid. The purpose of bridging is to keep the joist in alignment and distribute to all of the joist any exceptionally heavy loads or sudden jolts. A bridged joist will take three times as much weight as an unbridged one. For a joist span of 10 feet to 14 feet, one row of bridging is sufficient, but in spans over 14 feet two rows should be installed. To estimate the number of lineal feet of bridging required determine the length of the run and multiply it 2½ times.

TRICKS FOR FARM CARPENTERS

There are a number of tricks that help an amateur do better carpentering on the farm. Below are listed a few that ease the job.

To Apply Building Paper

Building paper is often difficult to handle during application. Here is a method that can be used to advantage, even where a man must work alone, making unnecessary to pre-calculate and measure the length of each strip in turn; also avoiding the trouble-some proposition of having paper roll around the yard.

First, set out two trestles and cut small V-shaped semi-circular notches in the center of the tops of each to receive a piece of pipe or a broom handle. Pass the pipe through a roll of roofing paper and lay it across the trestles in the notches. This arrangement leaves the roll free to revolve. In applying the paper on the side of the building, simply pull up on it and start nailing it in place.

When applying paper to the gable end of a building, first pre-determine the angle to be taken off the top. A plywood pattern with the true angle can be used for this purpose. If the trestles are set on skids and nailed in place, the entire piece of equipment can be easily moved around the building as the work progresses.

How to Increase Life of Hammer

To increase the life of your hammer, first train your eye and hand to work in coordination. Muscular action alone can build up the force of a true blow which does not damage the hammer's head. Along the handle of your hammer you will find a point where the hammer "feels" just right when you grasp it. Extend your thumb from this point along the handle and keep it there when hammering. In giving the hammer the proper swing, your arm must pivot at the shoulder, wrist and elbow. Practice until you get this swing perfected.

With certain exceptions, all hammers have polls with crowned faces. The principal purpose of this crown is to allow for a variation in the lines of force. If the nail bends or the hammer head glances off the nail too often, the chances are the hammer's face has become flat. By careful grinding, you can crown the face again.

To fit a hammer handle, first trim it to a close fit in the eye, making certain the head is both vertical and horizontal with the handle. Use only metal wedges to tighten the handle in the head.

To ensure that handle will not come loose, bore a hole ¼-inch in diameter in the back end to a depth of about two inches. Fill the hole with linseed oil and plug with a small pine plug. The linseed oil will keep the wood alive and the head will not become loose. Also, give the outside face of the handle some oil. Remove the plug periodically and refill the oil.

To Remove Interior Trim

If you desire to re-use the trim around window frames and doors, don't use a wrecking bar to take it off. Remove the trim by using a 3/32-inch pin punch. Use the pin punch like a nail set, and drive finishing nails clear through the trim. This does not split trim. Holes can be filled with wood putty.

How to Drive Nails

When driving nails into bevel or lap siding, drive them at a slightly upward angle. This method causes surface water to drain from nail head, thus reducing check of the board and loosening the paint. Do not drive nail too near the bottom edge of the siding, as this will split the siding underneath.

Greater strength is obtained through toe-nailing when a slight crook is made at the point of the nail.

To drive nails in hard-to-reach places use a short piece of metal tubing wide enough to accomodate the head of the nail to be driven. Then take an iron rod which fits loosely into the tubing. Rod should be square at both ends. To use, place nail in tube and insert rod behind it. By striking the rod with the hammer, the nail can be driven into place.

When driving nails into plaster for the purpose of hanging pictures or other articles, prevent the surface from shattering by applying two pieces of Scotch tape in the form of a cross over the spot where the nail is to be driven. Drive the nail in the center of this cross.

Handy Miter Box

When you're doing carpentry work that calls for frequent use of the miter box, keep the box handy by boring a hole in it and hanging it to the saw horse. Or, hinge it to the end of the saw horse so it can be folded out of the way when not in use but can be brought to the top of the horse when it's needed.

How To Start A Hand Saw

Professionals have four ways of starting a saw, any one of which is good after a little practice. They are:

1. Start the cut with point of the thumbnail steadying the saw's blade just above the teeth.
2. Start the cut with the knuckle of the thumb guiding the blade.
3. Start the saw in a notch cut with a jackknife. Make the notch with two cuts, one straight down at the line marked for sawing, and the other slanting downward from the waste end of the board.
4. Guide the saw blade with a block of wood held with the end on the line marked for sawing. If you like, you can fasten the block in place with a C-clamp.

Anchoring Bolts or Rail in Concrete

Push anchor bolts in while the concrete is wet, leaving threaded end up. Allow the bolt to extend enough above the concrete to take the plate, a couple of washers, and the nut. To overcome turning on the part of the bolts, bend the bolts about two or three inches from the heads before they are inserted in the concrete.

To set iron railing or posts in concrete, put old glass bottles in the soft concrete, setting them as deep as desired. When the concrete is dry, tap the bottles to break them out. Insert the post or rail and grout them in.

How To Salvage Old Doors

Many an old door can be salvaged with a little effort. Lay the door over two saw horses. Use two clamps that reach across the width of the door. Draw clamps up snug but not tight. Square the panels of the door by placing a two-foot steel square against the rails and stiles and pound them in position with a hammer. Then draw up clamps as tightly as possible. Bore two ½-inch holes at top and bottom of each side stile at a 75-degree angle at least 2½ inches deep. Drive ½-inch diameter hardwood dowels in each hole, then drive small metal wedge into end of each dowel.

Remove the Squeak of Hinges

If your home has one or more doors that squeak or creak when they are opened or closed, here's how to cure them. Pull the pins out of the hinges, then polish the part of the pin that goes into the hinges with fine steel wool or fine sandpaper to take off old grease, varnish or paint. Then rub a good coat of vaseline on the part of the pins that slips into the hinges. Swing the door back and forth a few times to work the vaseline into the hinges, then wipe off the hinges with a soft clean rag. Your door will not creak again for a long time.

SUGGESTIONS FOR LIGHTNING PROTECTION

No lighting system is effective without the following: (1) proper materials, such as points, connecting clamps, conductor, and ground rods or cables. (2) metal parts that are correctly installed, including hay racks, metal roofs and the water system, and (3) maintenance of all parts, so they remain in excellent condition.

Down conductors must connect with moist earth at all times. The best ground consists of rods or pipes driven 10 feet into the ground in trenches.

Conductors to the ground should be protected against being pulled out or broken by implements or livestock. The ground connection should not come up through concrete or inside a shed. Protection of the soil around the connection will cause it to dry out and an otherwise effective installation will be ruined.

Remember this—when a rodded building receives a stroke of lightning, heat will be generated at the points where electrical resistance occurs. If your roof happens to be metal, the connecting joints must be tight and kept free of corrosion. If joints between the roof and down connectors or between the rods and roof become loose or corroded, fire may result. Pipes or rods should be flattened and securely fastened to metal roofing with at least two bolts or rivets.

When you re-roof a building, go over it carefully after the job is done and make certain the lightning protection system is in working order. Examine the points on the roof and the connections between them and the down-conductors. If a portion of the down-conductors is corroded or damaged replace it, for corrosion, once started, is hard to stop.

Pay particular attention to the connections. Do not attempt to re-use old, rusted or battered bolts when re-fastening the system to the building.

Use only materials that have been inspected and approved by the Underwriters' Laboratories which is maintained by the National Board of Fire Underwriters. Watch the installation of the ground connection, for this is the vital part of the system.

Incidentally, you can obtain lower insurance rates on your buildings if you have the lightning rod system installed by a licensed dealer who will see that you obtain an Underwriters' Master Label which can be attached to some building on the farm.

THE SEWAGE DISPOSAL TANK

A plumbing sytem for a farm home is never complete without a satisfactory disposal system. A simple septic tank has been found to be the most satisfactory solution to this problem.

Septic Tank System

The chief requirement of any septic tank is that it have adequate capacity for at least two days' storage, estimated on the basis of at least 30 gallons per person a day. There is little danger of making the tank too large. On the other hand, many small tanks bought ready-made prove to be too small.

The type of septic tank giving the best results is a simple rectangular unit with two chambers. The first chamber is six feet long and the second three feet long. Both chambers are three feet wide and four deep. It is adequate for a family of seven people. A larger family should have a larger one.

Satisfactory baffles should be provided to prevent the contents of the tank being stirred up when sewage discharges into it. Baffles must be provided at both the inlet and outlet ends.

The construction of the septic tank is not a difficult task. Anyone who can build a concrete sidewalk or concrete wall can build the tank. To construct one as shown in the accompanying drawing, requires seven bags of cement, one and one-half cubic yards of sand, and three yards of gravel.

Locate the tank at least 50 to 75 feet from the house. Good drainage is essential. The tile handling the discharge from the tank should be installed from 16 or 18 inches below the surface and on a slight slope (¼" to the foot) to permit the sewage disposal to seep into the soil. Usually a single tile line is sufficient. Where the plot of ground is not long enough to obtain proper absorption in a single line, distribute sewage in several lines, using a distributing box. When the workroom is on the first floor of the home, the septic tank need not be placed so deep in the ground.

The septic tank occasionally needs cleaning, for it does not completely purify the sewage. It breaks down the solid materials and liquefies a large part of it. A small amount of sludge gradually accumulates at the bottom of the tank. After a number of years this has to be cleaned out.

A properly functioning tank often appears to need cleaning out because of the thick scum on the surface, and because it is full. However, as long as there is a volume of liquid between the scum and the sludge below, it should function properly without attention. The only maintenance such a tank requires is pumping out when it becomes practically full of sludge.

HOW TO SEAL ROOF VALLEYS

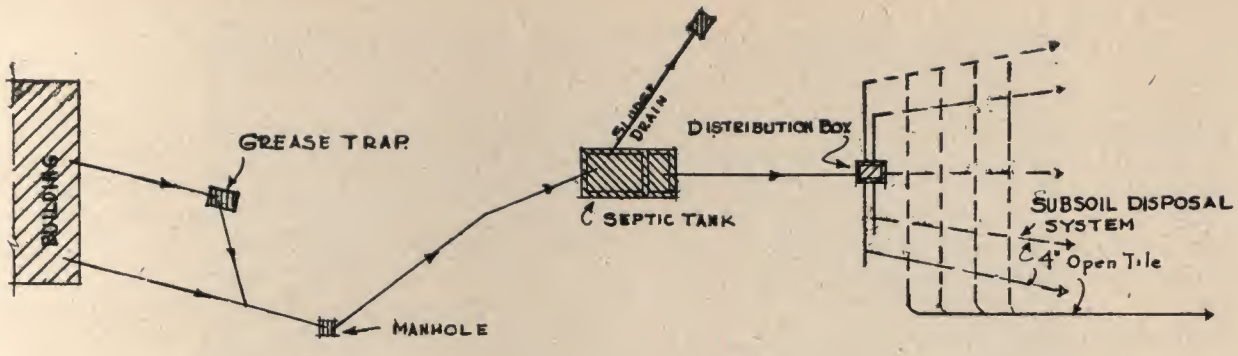
Every farm building, regardless of its type of roof construction, has vulnerable points which must be protected to keep water or moisture from seeping through. Generally, these trouble points lie where watertight joints cannot be made of the roofing material itself. A valley, for example, is very vulnerable and should be sealed with some non-rusting material which can act as a trough for water that flows with great force.

Heavy-grade copper (16 or 20 ounce) is a popular material for permanent flashing. It's easy to apply and economical to use. It comes in sheets of standard lengths and widths that can be bent with little effort to conform to any angle.

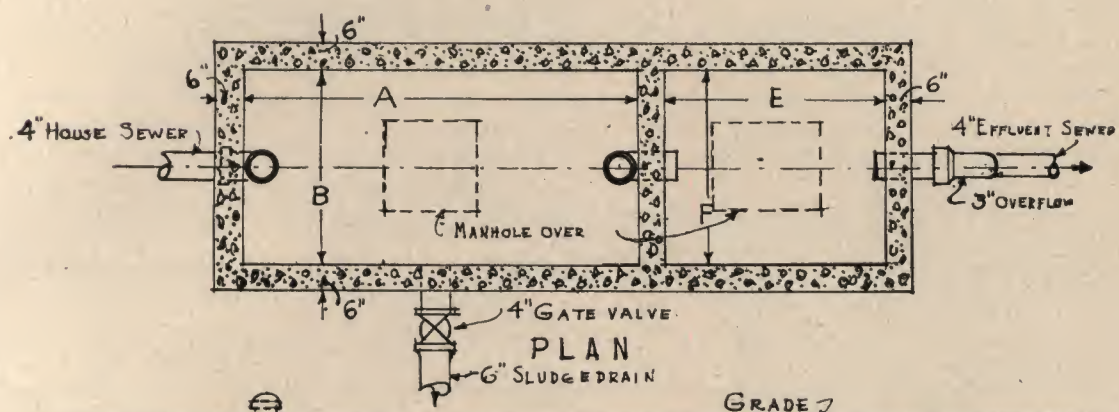
Flashing is generally applied before the roofing material, but when a valley flashing is rusted out, permanent repairs can be made by using squares of copper bent on a line between two corners to the valley angle. The bent square can then be inserted under the shingles, starting at the bottom and working to the top to form overlapping squares. Squares should be large enough to permit the upper edge to fit up under the second shingle about two inches.

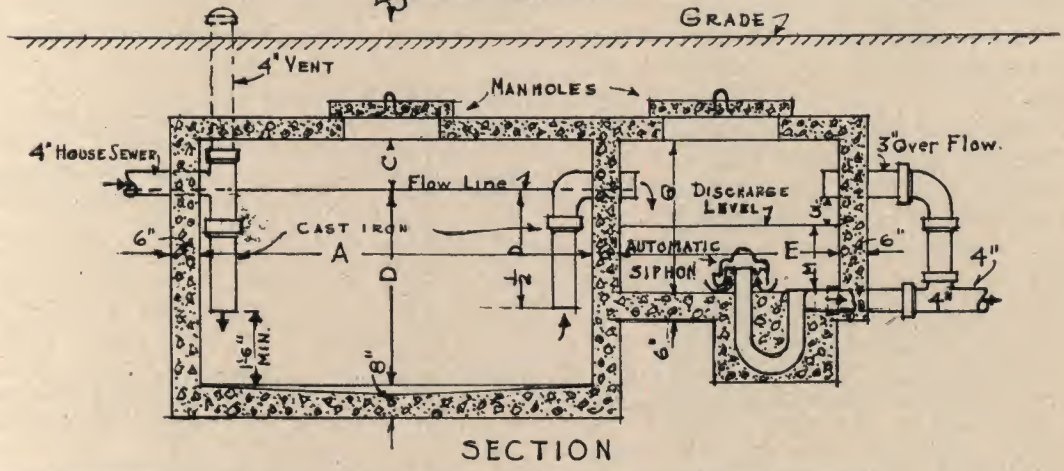
A common practice in new construction or where roofing is being replaced, is to flash valleys in what is known as "open style." In this method, full-size sheets of copper are bent up their length. This may be done with the help of a straight wooden board, such as a piece of 2 x 4. In most cases, several sheets of copper are needed to flash a valley.

It is best to put an edge at the bottom of the valley, extending it about ½-inch and bending it under. The first sheet of flashing



KEY PLAN OF SEWAGE DISPOSAL SYSTEM.





OCCUPANCY	CAP-GALS.	A	B	C	D	E	F	G
1 - 4	325	5'-0"	2'-6"	1'-0"	3'-6"	3'-0"	2'-6"	3'-0"
5 - 9	450	6'-0"	2'-6"	1'-0"	4'-0"	3'-0"	2'-6"	3'-0"
10 - 14	720	7'-0"	3'-6"	1'-0"	4'-0"	3'-6"	3'-6"	3'-0"
15 - 20	1000	8'-0"	4'-0"	1'-0"	4'-0"	4'-0"	4'-0"	3'-0"
21 - 25	1250	9'-0"	4'-6"	1'-0"	4'-3"	4'-6"	4'-6"	3'-6"
26 - 30	1490	9'-6"	4'-8"	1'-3"	4'-6"	4'-8"	4'-8"	3'-6"
31 - 35	1720	10'-0"	5'-0"	1'-3"	4'-8"	5'-0"	5'-0"	3'-6"
36 - 40	1850	10'-6"	5'-3"	1'-3"	4'-9"	5'-3"	5'-3"	3'-6"

NOTE:
CAPACITY OF TANKS BASED ON 50 GALLONS PER EQUIVALENT OCCUPANCY PER 24 HOURS.

is then placed and the lower edge is trimmed to the proper angle. This, too, is projected about a ½-inch beyond the roof's edge and is bent over the edge strip. It is good practice to cover the wood undersurface of the valley with asphalt felt before laying flashing.

All flashing strips are nailed along the upper edge only. The second flashing sheet laps over the first sheet a minimum of 6 inches. However, where the pitch of the valley is less than 4 inches per foot, the lap of the sheets must be more than 6 inches.

Shingles should not be nailed through the copper flashings. Lay them over flashings as directed. Usually the manufacturer suggests that shingles be laid over copper with the aid of roofing mastic.

WANT A PAVED FEEDING LOT?

Animals that have to fight mud do not do as well in the feeding lot as those that take their feed on a dry surface. Also, there's little chance of manure being salvaged from a muddy yard.

Paving the yard is a job that can be done with regular farm labor, and it doesn't have to be done all at one time. Many farmers build paved yards by laying a strip or two of concrete at a time. You can start yours by first determining the size lot you need, then select a site that is convenient to water and feed. A cow needs 30 to 40 square feet of lot and a hog will use 12 square feet of floor space.

First bring in a bulldozer and level off the ground. Lay the concrete floor on six inches of well-tamped gravel or cinders, and slope the fill so it pitches ¾-inch to a foot of run. This enables the finished floor to drain freely. Most farmers use a 4-inch thick concrete slab, but a 6-inch thickness is better where heavy loads will be driven across the lot.

For the side forms of a 4-inch slab use 2 x 4's set on edge. With a 6-inch slab use 2 x 6's. Set these to the same pitch as the finished floor will have. The tops of these forms can be used as guides for striking off the concrete.

Run the concrete in one continuous 10-foot strip. It isn't necessary to put in expansion joints, but it is best to cut dummy joints across the pavement at 10-foot intervals to control serious cracking. Make the joint by drawing an axe blade across the slab when the concrete gets stiff. A 2 x 6 straight edge will help guide the axe. The depth of the groove should be one-half the thickness of the slab. Smooth both edges of the joint with an edging tool.

If more than two strips of concrete are laid at one time, cast alternate 10-foot wide strips first. When these harden, pour intermediate sections.

Ready-mixed concrete is now available in most populated areas. If the cost is within the reach of your pocketbook, buy it and save labor. If you mix the concrete on the farm, the proper mixture is 1 part concrete, 2¼ parts sand, and three parts coarse aggregates. Place the full slab thickness at one time. Tamp the concrete well and remove excess with a 2 x 4 strikeboard. Finish the surface with a wood float but take care that the surface is not too smooth. Animals must not slip on it when rain or snow falls.

TABLE I — THE RIGHT ROOFING MATERIAL IN RELATION TO THE PITCH OF THE ROOF

Flat roofs	—Canvas decking and some types of metal roofing.
Slope 1 in. to 1 ft.	—Built-up roof of low melt point asphalt and some types of metal roofing.
Slope 2 in. to 1 ft.	—Built-up roof of higher melt point asphalt and some types of metal roofing.
Slope 3 in. to 1 ft.	—Any asphalt smooth or mineral surfaced roofing. some types of metal roofing.
Slope 4 in. to 1 ft.	—Thick butt asphalt strip shingles; some types of asphalt locking shingles (re-roofing only) and natural slate or metal.
Slope 5 in. to 1 ft.	—Asbestos shingles, individual shingles laid Dutch lap. Note: One type of asbestos shingles can be laid on slopes of 4 in. to 1 ft. Metal roofing.
Slope 6 in. to 1 ft.	—16-in. red cedar shingles (Can be laid on a slope of 3 in. to 12 in. if laid with an exposure of 3-¾in.)

15 IMPLEMENT SHED AND WORKSHOP

For description and illustration see page 49

16 CORN CRIB

For description and illustration see page 50

15. IMPLEMENT SHED 36,864 cubic feet. Including storage sheds and two story shop.

With the mechanization of farms, and the ever increasing development of labor saving farm implements such as tractors, hay balers, and harvesting machinery, costing thousands of dollars, it is more than imperative that these very valuable machines be properly housed and repaired or fitted for the varied operations.

To do this or not to do it, may mean the difference between success or failure in terms of dollars and cents produced.

The building shown here is designed to not only house the implements, but to provide proper space and equipment for the repairs and alterations to the various machines, and the general shop work required about a busy farm.

The building may be expanded in both directions to provide additional storage space as added equipment is acquired.

The central part of the structure provides a work alley, where a piece of equipment may be driven in and worked on, in a heated shop. The first floor is for heavy machine work, blacksmithing, welding operations, motor overhaul, and the like.

The second floor of the shop is for light machine work, electrical work, and carpentry work. There is space for the required power tools in addition to work benches and storage of parts.

The footings and piers are made of poured stone concrete, and the foundation walls are high test concrete block, laid up in Portland cement mortar.

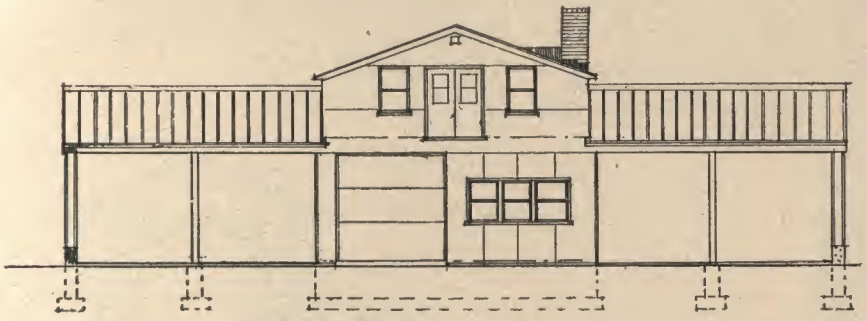
The building is framed of structural grade Douglas fir or spruce, and all members are properly sized to withstand heavy loads and braced against wind stress.

The exterior walls are sheathed diagonally with tongue and groove sheathing, and covered with sheets of asbestos board, which is fire retarding, and is economical to apply.

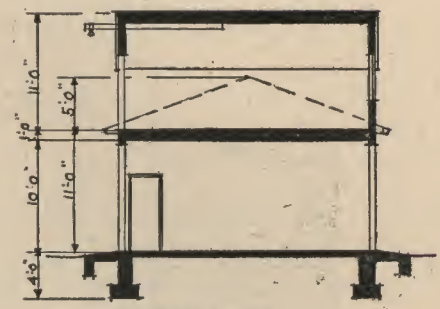
The roof is sheathed, covered with heavy roofing felt, and then with aluminum roofing, which has lock joints, and will last for a lifetime.

The exterior trim is all of white pine, painted, and the large sliding doors are double sheathed and braced. They operate on overhead tracks equipped with ball bearing rollers, so that they can be moved easily.

The implement storage areas have stabilized dirt floors, and the first floor of the shop is concrete.



ELEVATION



SECTION

Complete working plans
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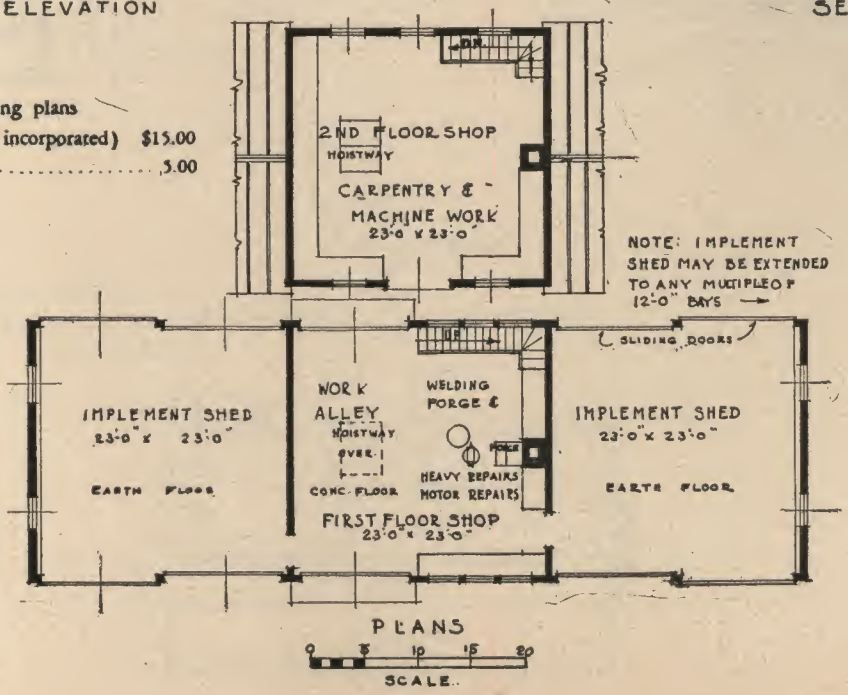

PLANS

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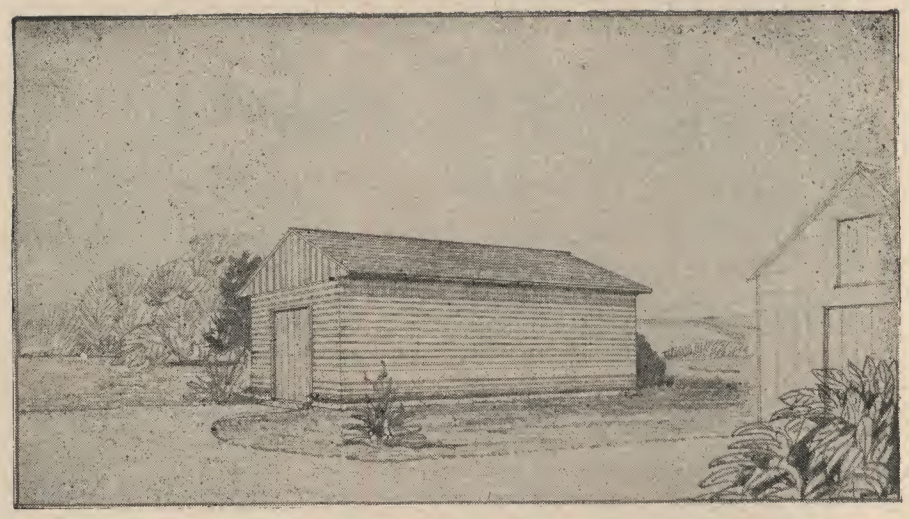


16. CORN CRIB 16,560 cubic feet.

The proper storage and protection of harvested corn and other grains has always been extremely important. Now it is even more so, with the government support of commodity prices, and provisions for crop loans and sale, coupled with ever increasing surpluses, it is imperative that these commodities be properly stored.

Most privately owned granaries and corn storage facilities are woefully inadequate, and below standard. Thousands of dollars worth of corn, for example, is lost each year due to spoilage by weather, or spoiled and consumed by rats and other pests.

A large percentage of our corn growers are expecting to obtain government loans against their corn crop this year, or arrange for a sale of the corn to the government.

In order to obtain such a loan or sale, it is first necessary however, to raise and harvest the corn. Then it must be properly stored in a storage building that will meet the requirements of the loaning agency.

When an application for a loan against a corn crop is made, the corn is inspected and must meet certain standards. The building in which the corn is stored must also meet certain standards. It must be so constructed that the crop is safe from the elements, that it is properly ventilated, and that it is safe from damage by flood, ground water, and from rats.

The corn crib shown here meets these government requirements, and if the corn is of required standard, it will be approved if housed in this corn crib.

The design shown here has a capacity of approximately 2400 bushels of ear corn, in the two cribs each side of the drive alley.

The drive alley can also be used for the storage of farm implements, or as a feeding floor, if desired.

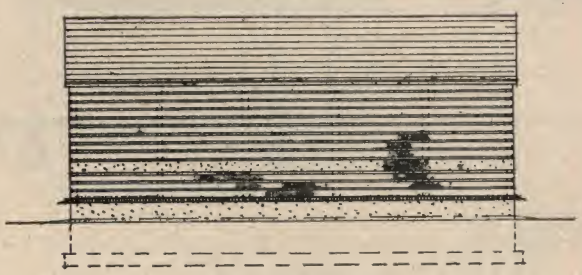
The building is supported on concrete footings and concrete foundation walls, which extend 2.0" above grade. The drive alley is floored with a concrete slab.

The structure itself is framed heavily with posts and braces, so as to withstand the heavy loads and stresses occasioned by the stored corn.

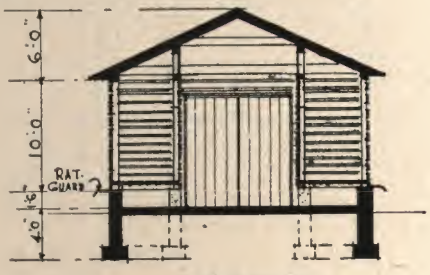
At the top of the foundation wall a metal rat guard extends entirely around each crib, and as an added safeguard, there is a continuous band of smooth asbestos board 12" wide extending around each crib at a point 2' 0" above the metal guard.

The sides and floors of the crib are formed of 1¼" x 6" slats. The cribs are also lined on the interior with rat wire.

The roof of the building is sheathed with tongue and groove sheathing, covered with heavy waterproof felt, and shingled with asphalt shingles.



ELEVATION.



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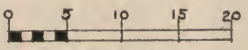

SCALE

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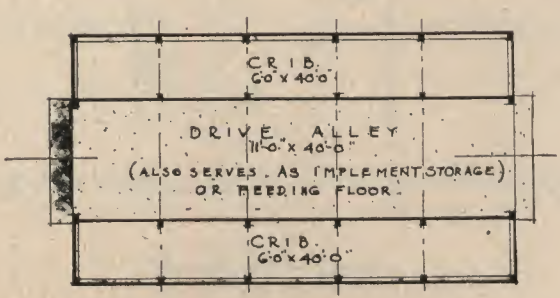

PLAN

17. GRAIN STORAGE BUILDING 6,000 cubic feet.

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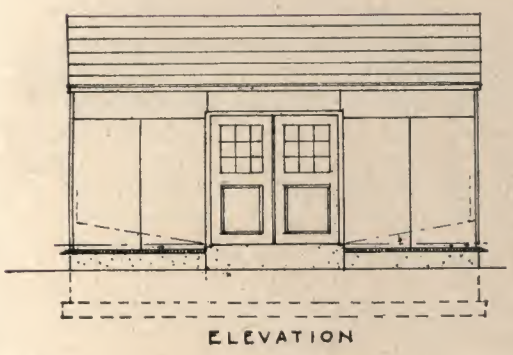
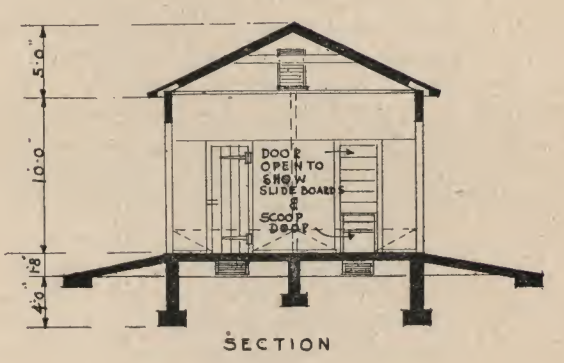
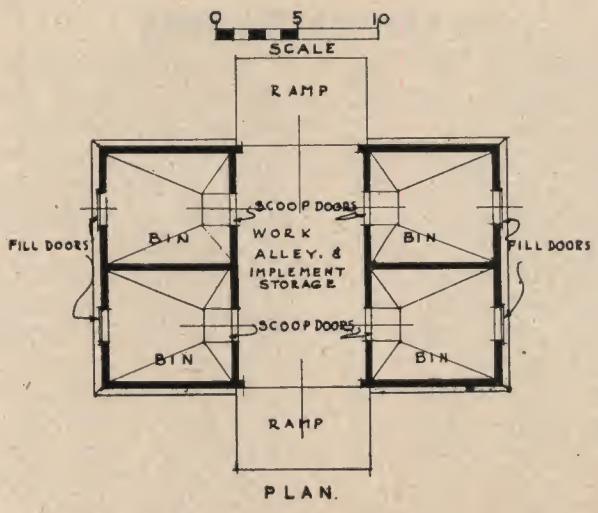






17 GRAIN STORAGE BUILDING

See illustration on page 51

Additional storage space is now urgently needed, and it appears very likely, according to advice from the U. S. Department of Agriculture, that this space will have to be provided by the grain grower.

Not only that, most farmers producing a crop of grain this year will either desire to, or be forced to, apply for loans against their stored crop, or ask the government to buy the crop.

In either case, it must be remembered that in order to obtain such a loan, or negotiate such a sale, under the present government regulations, the crop must be harvested, must measure up to the required standards as to quality, condition, and also must be stored in granaries which meet the U. S. Department of Agriculture's approval. To obtain such approval, the storage facilities must be proof against spoilage due to improper handling, overheating, dampness, and the grain must be stored so that it is not liable to be damaged by rats and other pests, or be liable to damage due to floods or the weather.

To meet such rigid qualifications, the granary shown here has been designed in accordance with the latest advices obtained from the U. S. Department of Agriculture.

It may be stated here, that if a farmer constructs such an approved type of granary, he may obtain a loan from the Farmer's Home Administration to cover the cost of the work. This loan is repayable over a 33 year period. (See the building guide section in this book, also the text regarding Farmer's Home Administration loans.)

The footings are poured stone concrete 1 : 2 : 4 mix, and are located 4′ below grade so as to be below the frost line. The foundation walls to a point 1′ 8″ above grade, are constructed of high strength concrete block laid up in Portland cement mortar.

The building is of heavy frame construction, utilizing structural grade Douglas fir for the various framing and bracing members.

The exterior walls are first sheathed diagonally with tongue and groove sheathing. Then they are covered with heavy waterproof building paper, and finally the whole exterior surface is covered with asbestos board, which is applied in large sheets, and gives weather as well as fire protection.

The roof is also sheathed with tongue and groove sheathing, and then is covered with 30 lb. roofing felt. Over this is applied a slate surfaced roll roofing.

The exterior trim is all white pine painted.

The interior walls and partitions are also covered with the same asbestos board.

The building is adequately ventilated and will take care of approximately 1,800 bushels.

There is a metal rat guard all around the building at the floor line and, in addition, a layer of rat wire is applied to the studs before the asbestos board is applied.

18 BEEF CATTLE SHED

Here is a cattle shed which is very economical to construct and will house and feed approximately 90 to 100 steers.

This cattle shed being of the new pole barn construction, can be quickly erected by the average farmer with the help of two or three assistants. The poles are pressure treated, and set in the ground to form the main supporting members. Ordinary local rough lumber can be used for the rest of the frame as no great loads are imposed upon it.

The pole frame is filled in with vertical studs, sheathed and then faced with plain board siding applied in shiplap fashion or vertically with battens, if desired.

The roof is of purlin construction, and covered with corrugated aluminum roofing.

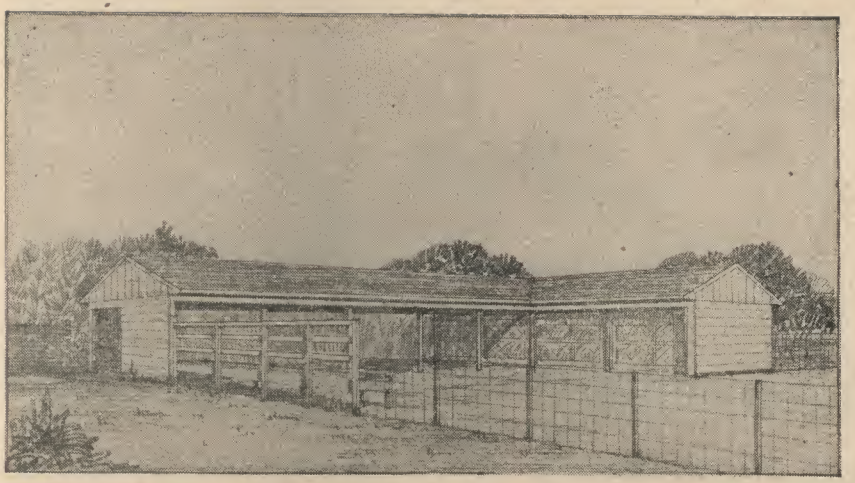
An alternate finish would be to use large sheets of asbestos board for the side walls, and asbestos shingles on the roof.

This building is also acceptable for a loan from the Farmer's Home Administration and this loan is payable over a 33 year period at 4% interest.

One wing of the building is used for hay storage, and there are movable feeding barriers which are pushed back as the hay is consumed.

Ensilage bunks are located along one side of a paved yard, and are filled direct from the silo by means of an overhead feed carrier.

An electrically heated watering tank is conveniently located in this paved feed lot.



18. BEEF CATTLE SHED 16,000 cubic feet.

Complete working plans
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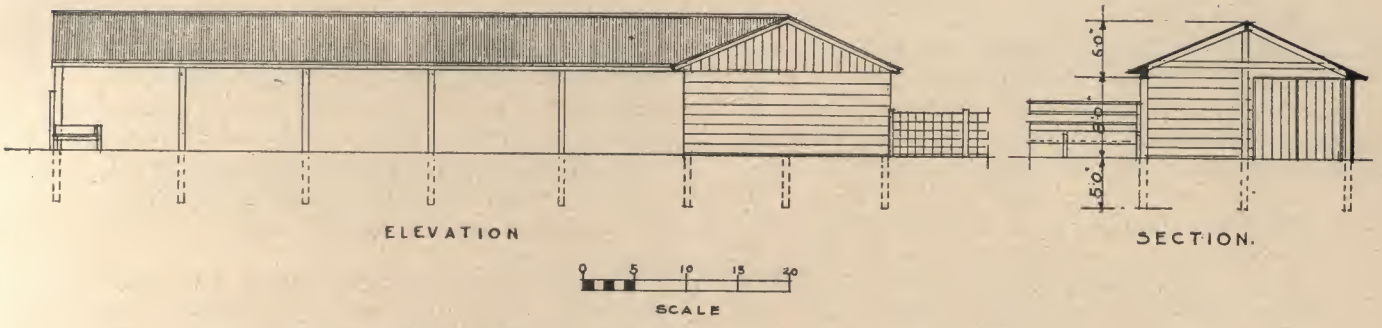
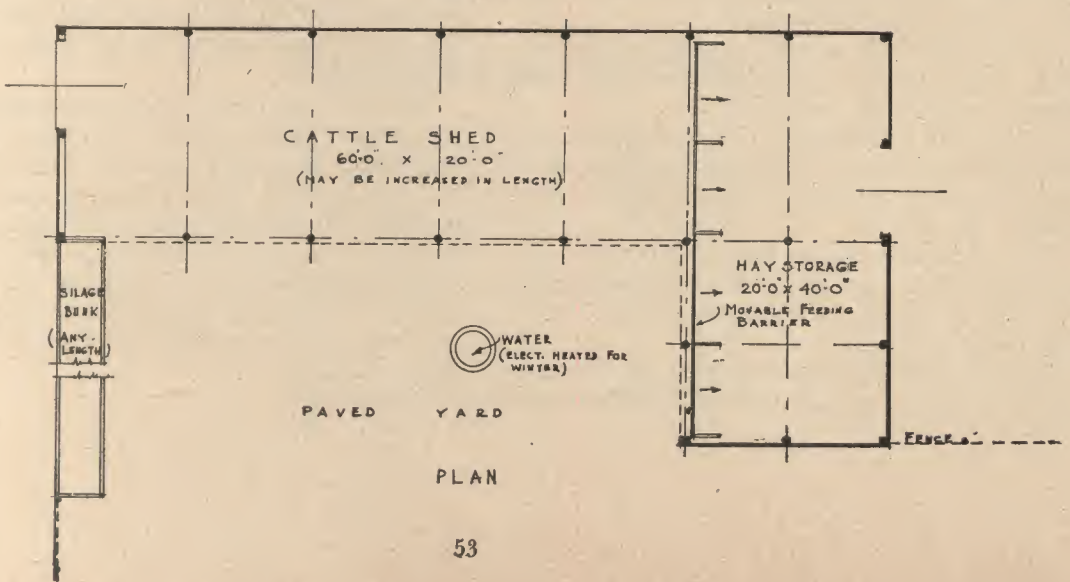
Duplicate Set 5.00





19 VEGETABLE CELLAR

For description and illustration see page 55

20 STANCHION DAIRY BARN

For description and illustration see page 56

21 SUMMER LAYING SHELTER

See illustration on page 57

This mild weather laying shelter is the answers to two common poultrymen's problems.

How to carry more layers without spending a large sum of money for the erection of a new laying house, and how can I get more eggs during the summer and fall months, when egg prices are high, and when the regular laying flock is not producing at peak.

This laying shelter building answers both of the above questions, and not only that, it can be converted later into an all year round laying house if one desires.

This is a pole barn type of laying house which is economical to build. The frame is of pressure treated poles set 5′ 0″ in the ground for the main supporting members. The balance of the structure is typical pole barn construction, except that this building has a series of open spaces along each side, which are covered with chicken wire and, which also have hinged sections which raise up against the overhanging eaves. Each of these hinged panels has a window in it, which is fitted with "cello glass' a wire mesh and clear plastic material.

In the colder fall months, or during stormy days, these panels are lowered so that the house is completely enclosed.

To prevent the entrance of rats and other pests, there is a layer of wire mesh under the floor litter, which turns up on all sides to the window sill level.

The entire area below the window sill line inside and out, is covered with asbestos board. The roof is covered with corrugated aluminum roofing sheets.

These laying shelters cost just about one half as much as reguar laying houses.

This plan calls for a house 30′ wide and 60′ long, which can be lengthened indefinitely in 15′ units. Pole-frame construction keeps cost down.

There are two systems for using these shelters. Have two shelters with a combined capacity of 1,600 birds (figuring three square feet of floor space per bird.)

In November, buy 2,000 pullet chicks for your regular brooder houses, and about March 1, move them to the laying shelters. They begin to lay in May, and produce heavily during the summer. About August 1 turn on the lights, and in late November sell the birds for meat.

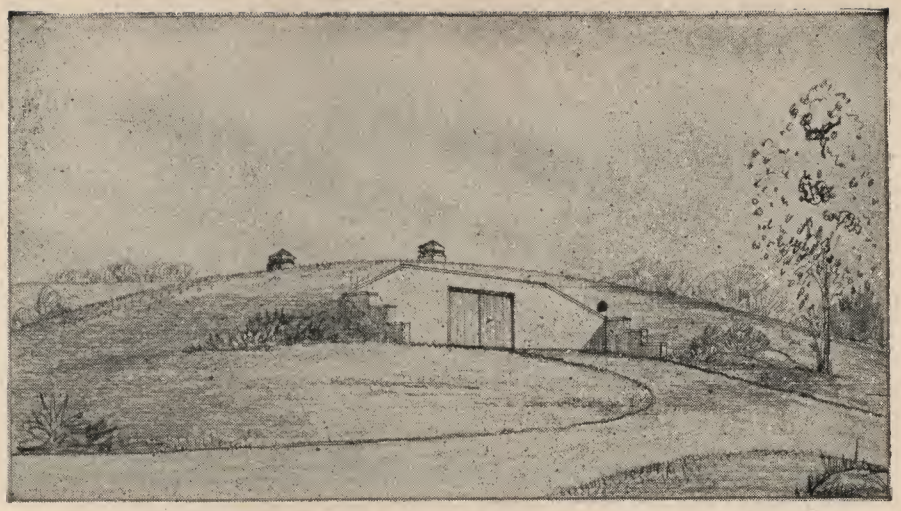
If you hold them longer you are sure to run into a partial molt. Besides, fowl prices are usually good at that time. And, of course, the laying shelters aren't designed to carry birds through mid-winter, unless converted.

In the meantime, brood a batch of spring chicks, which go through the winter in your regular houses.

Start another lot of May chicks, and when they are coming into lay in November, sell off last year's January-hatched birds, which are left in the regular laying house through the summer.

Either system calls for a two-hatch schedule. Both of them make extra use of brooder facilities. And both call for "doubling up" the laying flock during the summer and fall months, when egg prices are highest.

If you are going to use the system on your farm, our experience is that one third to one half of your total laying house capacity is just the right proportion to have in shelter-type housing.



19. VEGETABLE CELLAR 12,800 cubic feet.

Underground storage cellars maintain cool temperatures with the proper amount of humidity necessary for the keeping in good condition over a long period of time such commodities as root crops, beets, turnips, potatoes, apples and various other vegetables.

The cellar design shown here is easily constructed by local labor, and with durable concrete so that it will last a lifetime.

Provisions have been made in the interior design so that the bin partition can be changed, to accomodate various amounts and kinds of stored commodities.

It is possible to drive a loaded truck into the cellar, facilitating the storing and shipment of the stored produce.

Proper control over ventilation in an underground storage cellar is of the utmost importance, and this has been provided for by a complete mechanical ventilation system.

The foundation, walls, columns, and roof, of this structure are all of reinforced concrete, and the walls and roof are waterproofed and insulated to prevent condensation, one of the greatest causes of spoilage in underground storage buildings.

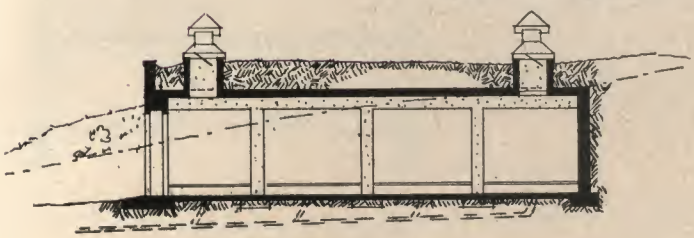
While the design shown is located in a natural hillside, it may be erected on flat terrain, and then covered with earth fill to accomplish the same result.

In this case, the cost of excavating a hillside is balanced by the fill or cover required on a flat site.

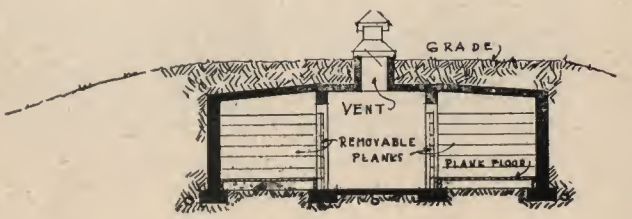
The bin floors are constructed of plank, with a space of ¼" between the floor planks to allow for circulation. The sides of the bins as stated above, are removable, and consist of 2" x 6" plank which fit in channel iron guides, with spacers between each plank to allow free circulation of air.

The entrance to the storage cellar consists of double doors spaced 1' 0" apart, and which have rubber gaskets to insure a tight fit.

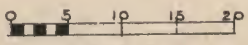
The roof vents which extend above the earth fill are equipped with rotary ventilators, and butterfly dampers, so that perfect control is assured at all times. These ventilators are controlled above grade, so that it is not necessary to open up the cellar to adjust them.



LONGITUDINAL SECTION



CROSS SECTION



SCALE

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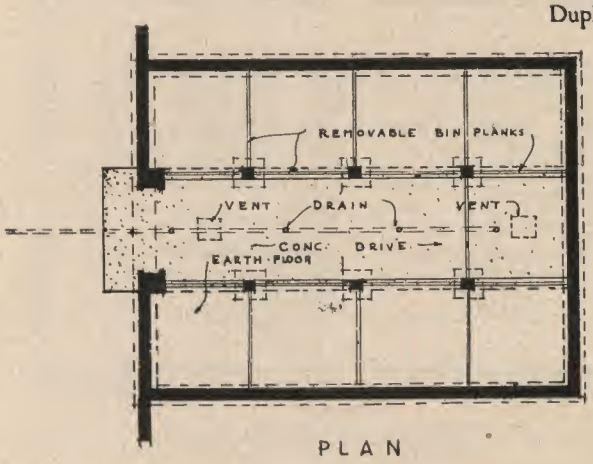


PLAN

20. STANCHION DAIRY BARN 51,840 cubic feet.

The design shown here is for a standard stanchion type dairy barn and hay storage loft. While many dairy farmers are changing over to the loafing barn to house their herds, there are many who believe that the stanchion barn is the proper solution.

For those who prefer the stanchion barn, we have developed this design based on the latest and most economical principles of design and construction.

The footings of this barn are of poured stone concrete, and are located 4' below grade so as to be below the frost line.

The foundation walls and the barn walls to the hay loft level are constructed of high strength concrete block, laid up in Portland cement mortar, and painted inside and out with an approved brand of waterproof cement paint.

The barn floor is a concrete slab poured over 8" of broken stone fill and has the manure gutters, feed mangers and curbs cast integrally with it. The piers under the steel columns, which support the hay loft floor, are also of poured concrete.

The stalls and stanchions are standard steel tubular type, obtainable from any farm equipment manufacturer. It is always advised that they be consulted in regard to size, as the various breeds such as Jerseys, Ayreshires, Guernseys, Holsteins, etc., require different sizes of stall equipment. No attempt has been made in the accompanying design to establish stall sizes, as they will vary with the breed of stock which is kept. The owner must determine this, and order the proper equipment to fit the herd.

The superstructure and hay loft floor are of frame construction, and the framing members are all of structural grade Douglas fir or Sitka spruce. The particular form of trussed rafter is well suited to hay loft construction, as it leaves the loft free from obstructing members which would interfere with the storage operations.

The hay loft floor is double, with heavy felt between the two floors to prevent dust and chaff from working through into the cow barn.

The roof is sheathed diagonally with tongue and groove sheathing, then covered with heavy waterproof felt, and finally shingled with asbestos shingles, which are fire retarding.

The ceiling of the cow barn is covered with glazed asbestos board, which is easy to keep clean.

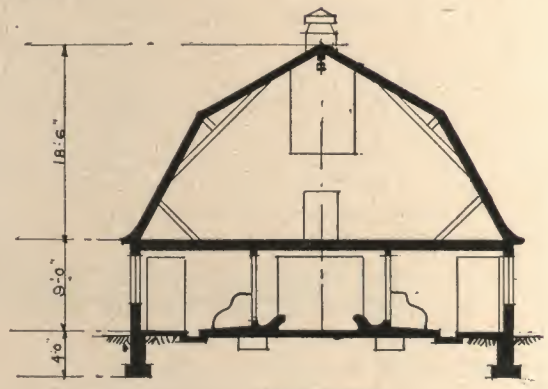
The lighting fixtures are recessed flush with the ceiling, so that no dust can accumulate on them.

All stalls are equipped with automatic water cups and salt block holders.

A feed room is centrally located at one side, so that one or more stock silos can be erected adjacent to them.

Our design #11 for a combination milking parlor and milk house can be used with this barn, if desired.

ELEVATION



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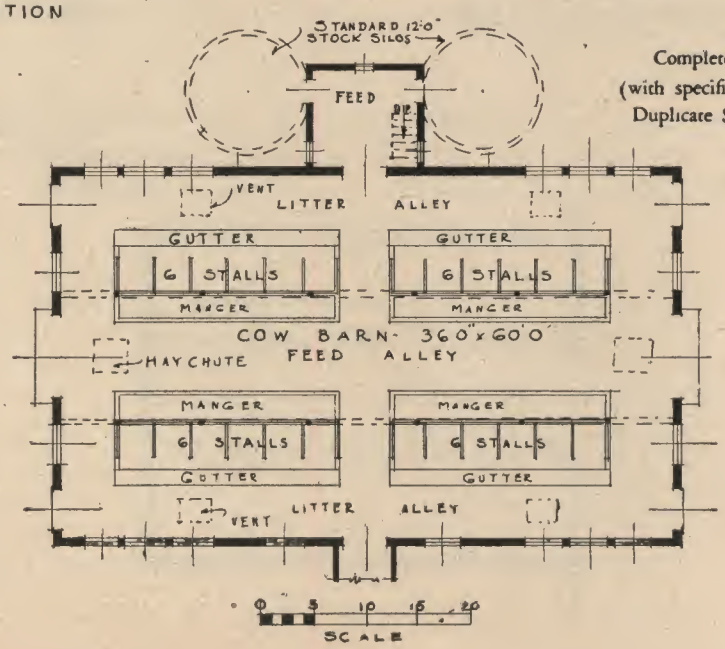

Complete working plans
(with specifications incorporated) $15.00
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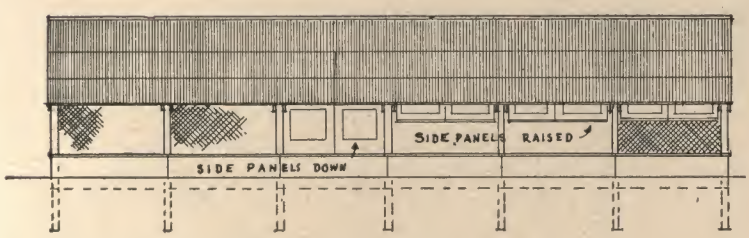
21. SUMMER LAYING SHELTER 18,000 cubic feet.

For description see page 54

Complete working plans

(with specifications incorporated) $15.00

Duplicate Set 5.00



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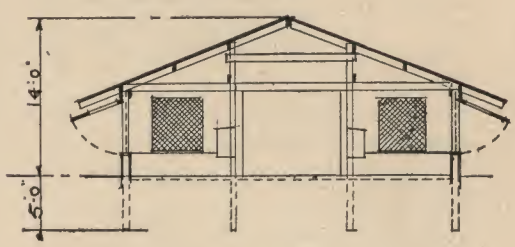

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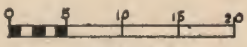
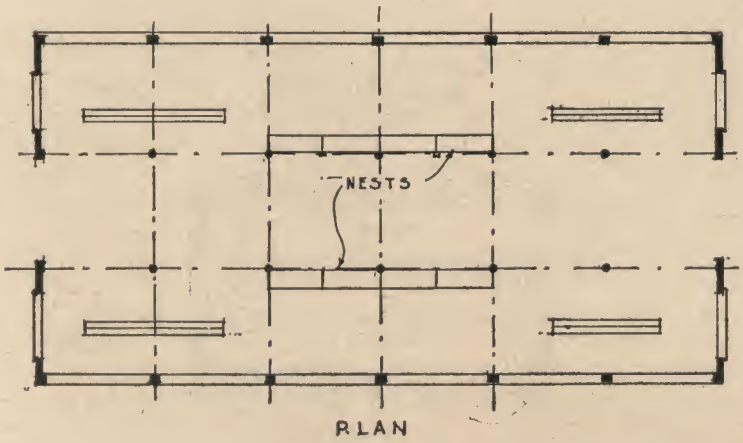


SCALE



PLAN

22. GREENHOUSE 2,400 cubic feet.

This small, low cost greenhouse is just the thing for starting seeds early, and for those farmers or farmer's wives who wish to get into the highly profitable side line of producing early plants, such as tomatoes, cauliflower, broccoli, kale, pepper, etc. for sale to farmers in the community, and through the various stores in the surrounding towns.

The walls are concrete or concrete blocks, and the sash are regular hotbed sash. The greenhouse should be located on a well-drained site with a southern exposure and protected on the north. Heat may be supplied by a coal or wood stove, hot water heat or electricity. Small water heating stoves are sometimes used for circulating water through coils under the benches. Modern electrical coil-heating cable is now used extensively in areas where power is available.

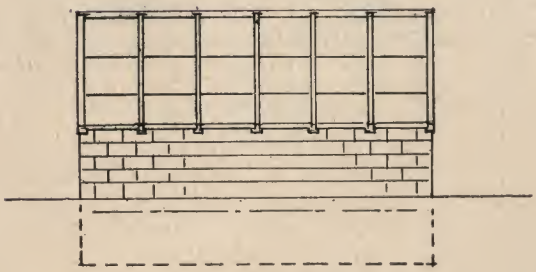
Have you ever noticed the spindly, pale, discouraged-looking plants offered for sale each spring by drug, grocery, hardware and "general" stores? Of course, everybody has! Have you ever wondered how anybody with even a smattering of garden knowledge could be tempted to buy such futile stuff? If so, has it ever occurred to you that in the very towns where these plants are displayed are good opportunities to make profitable sales of really well grown plants of good varieties for transplanting?

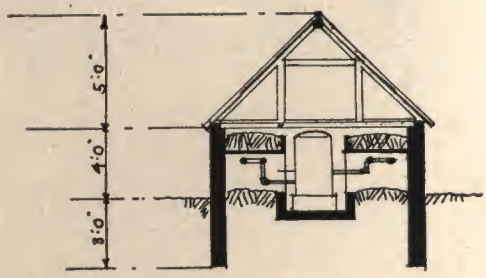
A greenhouse, even though a small one, gives a field limited only by its size, the available hands, and the means of disposing of the plants while in prime condition.

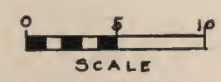
First, get an idea of the possible area of gardens and the quantity of vegetables and flower plants that might be needed during the first season; second, estimate how many house plants, bulbs in flower, and forced vegetables might be sold; third, make a similar estimate of the cut flowers that the community might use; and fourth, by inquiry learn about how many balls, dinners and other gatherings would likely occur and at about what dates. With these data in hand make production and sales plans.

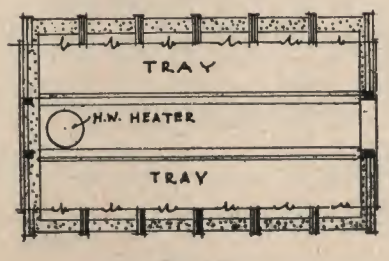
Among other ways by which money may be made by growing plants for sale are by propagating special varieties, strains or stocks of plants from seed or stock which patrons supply. Agreements in such cases, always in writing, might be at set prices for delivery of specified numbers or percentages of plants so grown to certain stages of development, the grower to own the balance. This plan has worked out especially well among people who come to the country from the city only in the spring or early summer, and who want to have plants of specified kinds ready for them to start their gardens.

"Glass" may be made one of the most profitable departments of the small farm, especially in localities where no such equipment is already established.









Complete working plans
(with specifications incorporated) $15.00
Duplicate Set 5.00

22 GREENHOUSE

For description and illustration see page 58

23 SOLAR DAIRY BARN

See illustration on page 60

This modern functional "Solar Type" dairy unit has been designed on the theory that it is no longer necessary, or desirable to lift weighty and bulky feed to the second story or loft, and then throw it all down again, when it is needed.

Contrary to considerable opinion, a dairy unit is a factory, just as much so as a shoe factory, and it is sensible to design the enclosure for the manufacture of milk along the same lines, and trends that would be employed for any manufacturing plant.

Raw products, the feed, should come in at one end, and be processed by the cows, and the finished product should go out the other end. In this case the milk house occupies the same relation to the barn or processing plant as the shipping department does in a shoe factory.

Hay and bedding is delivered to the large one story hay barn by tractor drawn wagons, is unloaded by mechanical equipment, stored in the "warehouse." From there it is conveyed by means of overhead conveyors to the barn, as one step in the assembly line. The silage and concentrates are likewise brought in at the proper point from the silo and feed room by overhead conveyors, and fed to the "machines," or cows.

The South side of the cow barn is filled with insulating, double thickness glass, to let in the sun, which floods the stall area with its health giving rays, in the winter when it is most needed.

The roof overhang on the south over the large window area has been worked out so as to let the low angle sun into the barn during the winter months, but keeps out the high angle sun during the day in the summer, when it is not wanted or needed.

The building is of frame construction, built over a concrete block foundation, and of course has a concrete slab floor throughout. The roof is insulated with four inches of "rockwool" insulation, with a vapor barrier. The walls are also insulated with not only the rockwool but with rigid insulation board sheathing.

The exterior walls are covered on the outside with asbestos board sheathing, applied over heavy felt paper. The roof is covered with three ply felt and asphalt roofing, applied over tongue and groove roof boards.

The cow barn and the milk house both are equipped with a mechanical exhaust system, which assures the right amount of ventilation at all times.

24 MILK HOUSE

See illustration on page 61

A good milk house is a necessity today, and the dairy man must have one if he expects to sell milk. All states have regulatory laws regarding this. The design shown here will meet the requirements for grade A dairy farms.

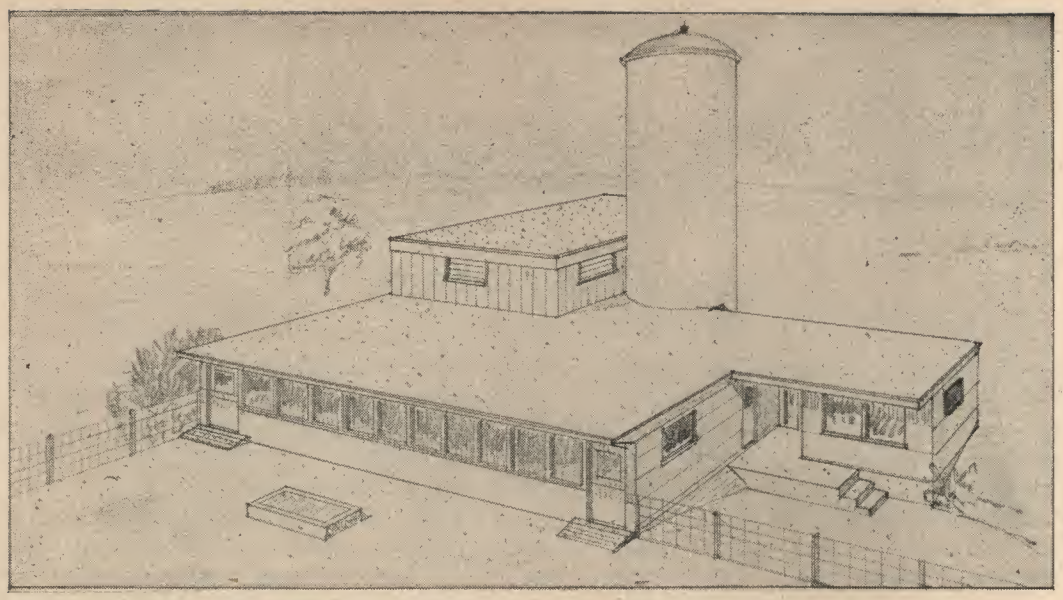
While the building shown is an attached structure, it can be built as a separate unit fully detached from the barn if desired. A separate enclosure has been provided for the compressor and the hot water heater, as some states demand it.

The building has concrete block foundation walls, concrete floors, and loading platform. The superstructure shown is of frame, but it could be built of concrete block. The roof is frame construction, and covered with asphalt shingles, laid over heavy roofing felt.

The walls and ceilings of the milk house are fully insulated with four inches of rockwool insulation. The large windows are glazed with double thickness insulating glass, set in wood frames.

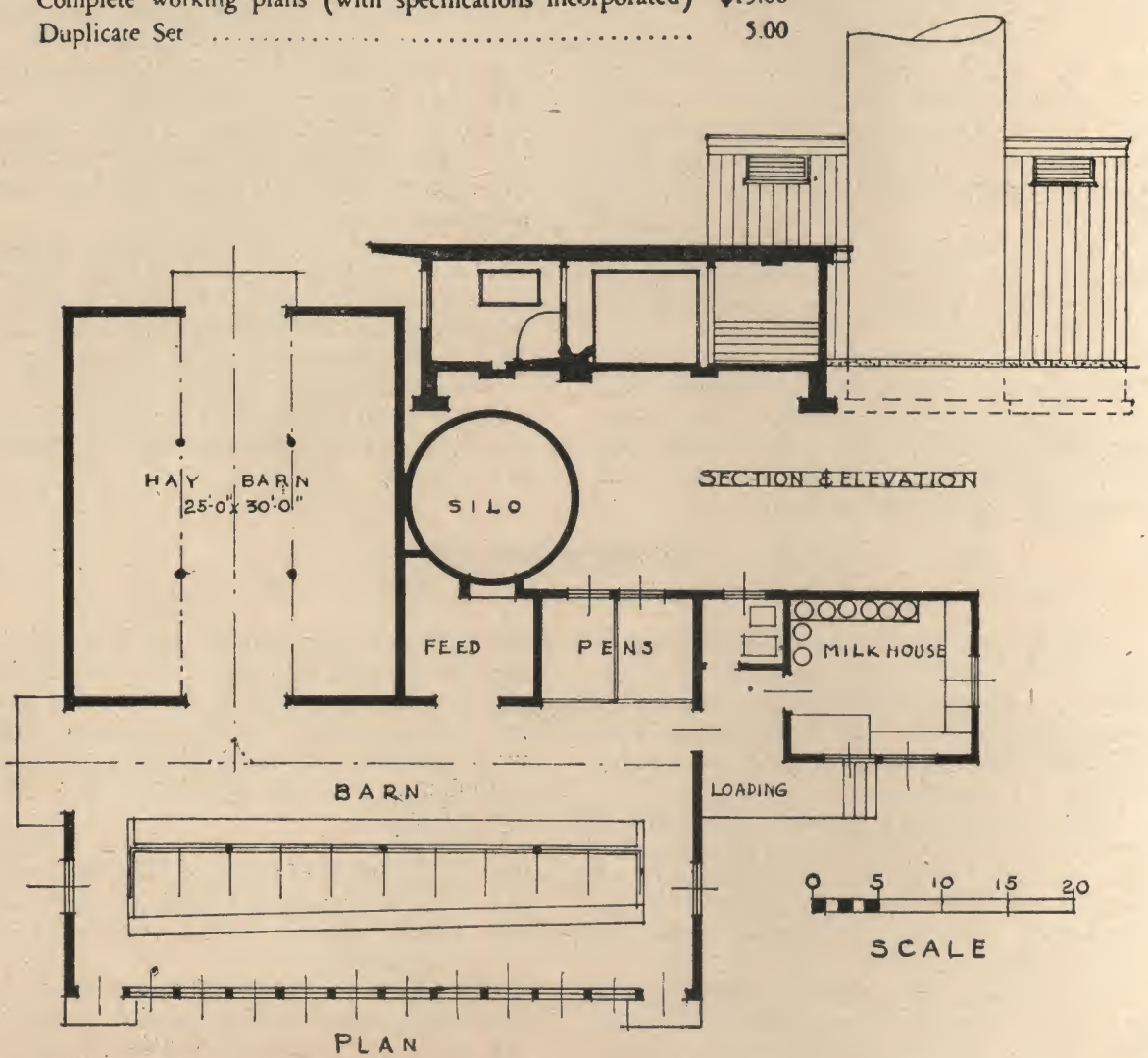
The equipment of the milk house is standard, and consists of; cooling tank, can racks, can filler, hydraulic can hoist, solution cabinet, record cabinet, scales, wash vats and metal top benches.

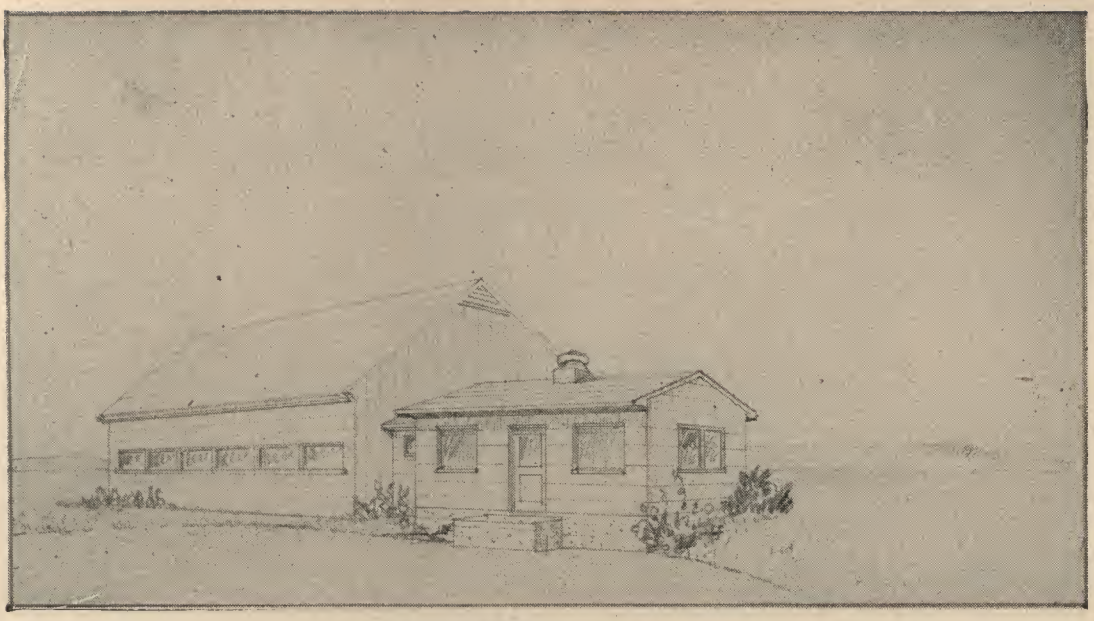
The floor is provided with floor drains, cove bases, and raised sloping section under the can racks. The building is ventilated through the roof with rotary type roof ventilators.



23. SOLAR DAIRY BARN **38,150 cubic feet. Including hay barn, cow barn, feed rooms, pens and milk house.**

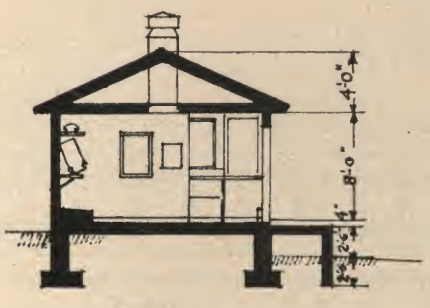
Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00





24. MILK HOUSE 7.440 cubic feet.

Complete working plans (with specifications incorporated) $15.00
Duplicate Set 5.00



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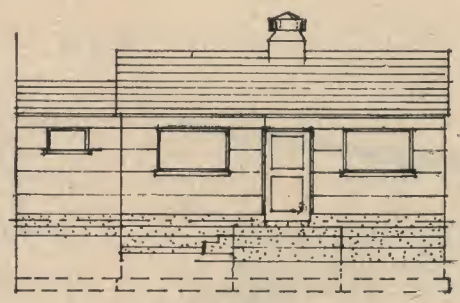

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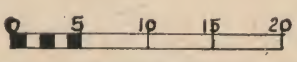

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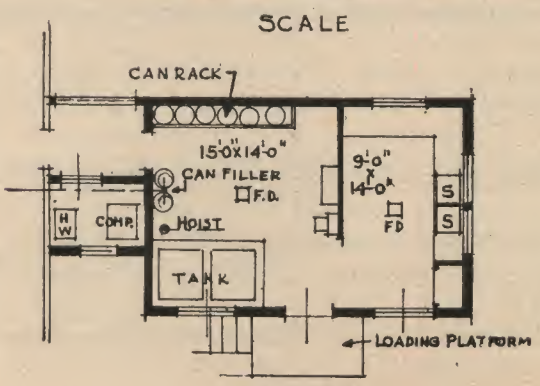
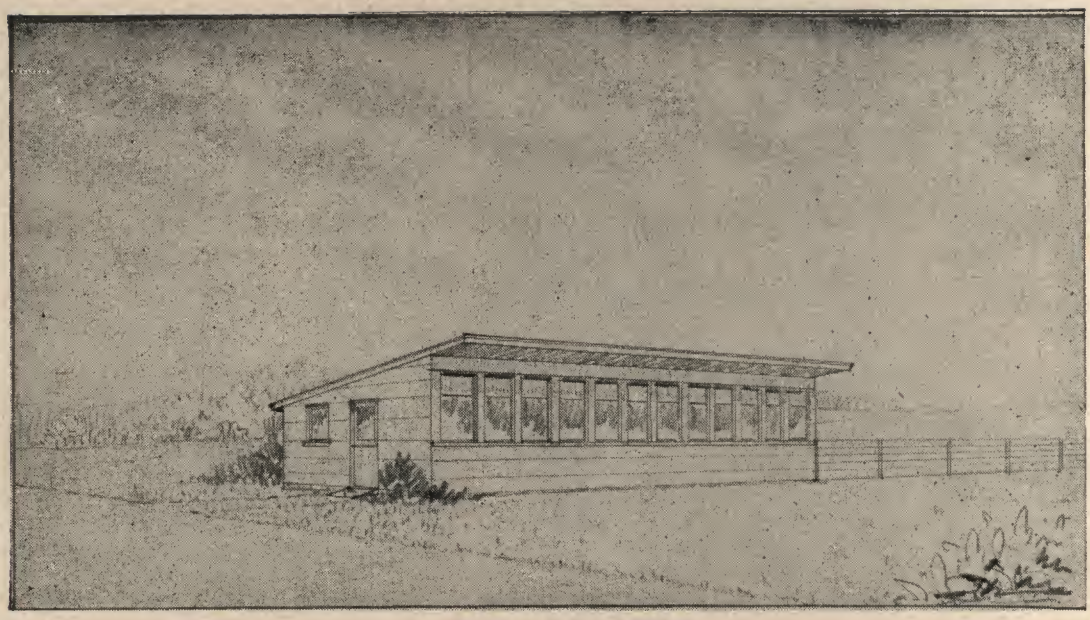


PLAN



PERSPECTIVE

25. SOLAR CALF BARN **15,275 cubic feet.**

Complete working plans (with specifications incorporated)	$15.00
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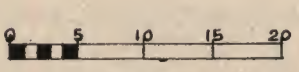

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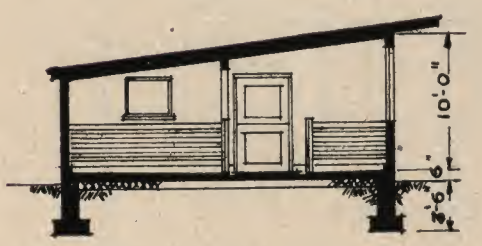

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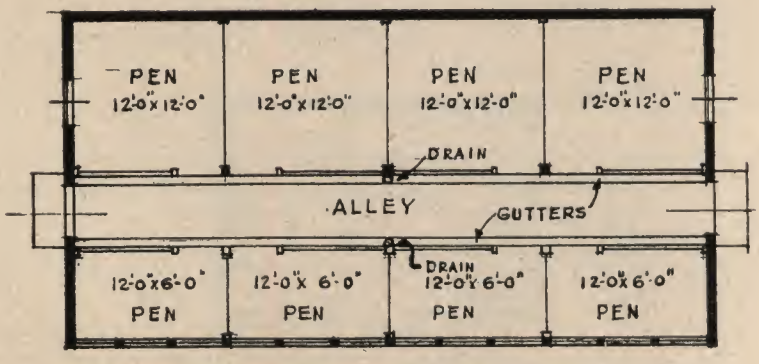


PLAN

25 SOLAR CALF BARN

The calf barn shown here has been worked out along the principles outlined above. There are four large pens, and four small pens, ranged along both sides of a central alley. The arrangement shown allows for easy access and cuts down the work required to care for the young stock. The pen divisions between the small pens are removable, so that the pens are flexible in size. The large pens are of suitable size so that one or more may be maternity pens if desired.

A drain gutter runs along both sides of the central alley, to care for all pen and alley drainage. The pen fronts are standard wire mesh units, while the cross partitions are made up of fir planks, to stop drafts, and interference.

The south side of the building is filled with insulation, double thickness glass, which will let in the health giving rays of the sun, so necessary to promote the good health of the calves.

The building has concrete block foundations, a concrete slab, over porous fill for good drainage, and a frame superstructure. The exterior walls are covered with asbestos siding, and the roof has a roll roofing top surface. All the walls and roofs are fully insulated with four inches of rockwool insulation.

The inside walls are covered with asbestos board, which is warm and easily kept clean and sanitary. The large windows on the south side are combinations of fixed and ventilating sash, and in addition there is a mechanical ventilating system, assuring perfect control over ventilation and dampness at all times.

26 BULL HOUSE AND PENS

See illustration on page 64

As every dairy man knows there are two very important things to keep in mind in regard to the housing of his herd sires. One is the proper housing of the bulls and the other is SAFETY.

Aside from the two points mentioned above, a good bull is a very valuable animal, costing many thousands of dollars. He is the assurance of good producing stock, and if the dairy farmer wishes to stay in business he must produce good calves and cows. So his bulls should be given the best protection and care, in a properly designed house, with plenty of chance for exercise.

The **bull house** shown here has been designed on these principles. Each bull has his own pen, strongly constructed, with concrete walls, and floors. The pens are also separated between with heavy steel pipe fences. Provision has also been made to feed the animals without the dangerous necessity of entering the pen.

All work may be done from the work alley in front of the pens, and if it is necessary to enter the bull pens the animals may be either secured from the alley, or allowed to go out to the yards, by means of remote control from the alley.

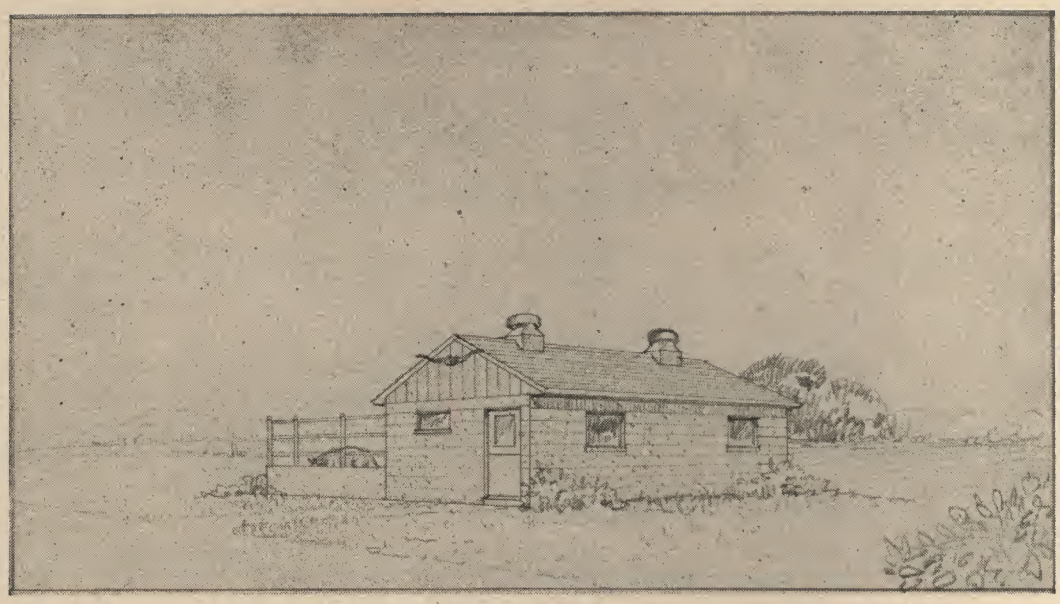
The building has a concrete block formation, and concrete floors. The separation walls of the pens are of concrete up to a height of three feet and from there on are heavy stock steel pipe. The exterior walls of the building are concrete block up to the plate line. The gable ends and roof are frame construction.

The roof is fully insulated with four inches of rockwool insulation, and the ceiling is covered with easily cleaned asbestos board. The roof surface is asphalt shingles laid over heavy roofing felt.

The yard walls are similar in construction to the inside pens, having concrete walls up to a height of three feet and steel pipe fences above this point.

One feature provided is the outside alley, which provides access to the service stall at the end. The cow may be brought in at one side, positioned, and then the bull may be led around to the service stall under perfect control all the time. This eliminates the chance of danger to the cow, and gives the farmer perfect safety in handling the bull.

Mechanically operated ventilators in the roof space assure perfect ventilation and freedom from dampness within the building at all times.



PERSPECTIVE

26. BULL HOUSE and PENS 11,115 cubic feet.

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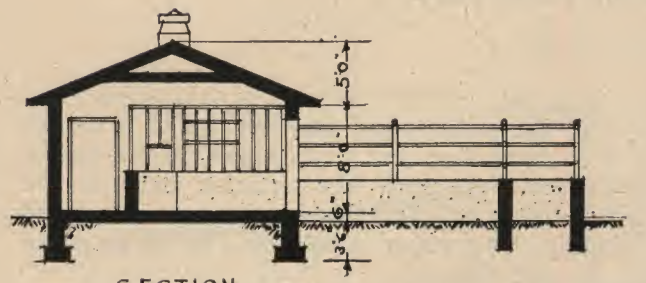
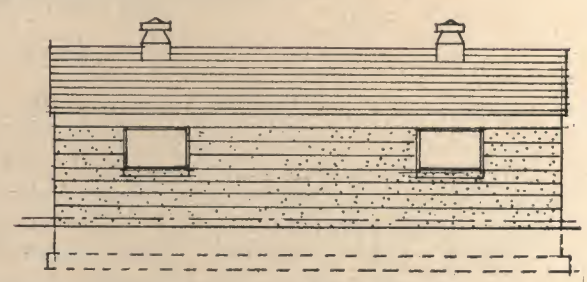
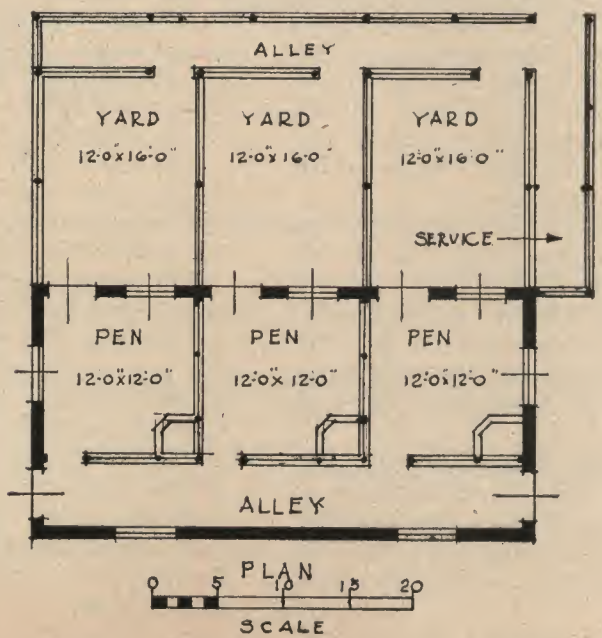


SECTION



ELEVATION



PLAN

SCALE

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